Organizational Arrangements for the Provision of Cross-Boundary Transport Infrastructure and Services

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Organizational Arrangements for the Provision of Cross-Boundary Transport Infrastructure and Services

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Territoire, c'est sans doute une notion géographique, mais c'est d'abord une notion juridico-politique : ce qui est contrôlé par un certain type de pouvoir

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through the 1980s for regional transportation projects in Atlanta. Indeed by identifying the locations and overall shape of the freeway network, including the interstate system, S.R. 400, and U.S. 78, along with the MARTA rail system, these documents provide the foundation of the backbone of the current regional transportation network. Though not all of planned networks were constructed, the decision to not extend the rail system, and the impacts arising from that decision, continues to be debated over forty years after the initial proposal for rail was developed in Atlanta.[1]

Today, instead of the envisioned encompassing regional transit system, transit services in Atlanta are sharply defined by county borders with five major transit operators, each with different fare systems and service areas rigidly defined by the political boundaries of the counties they operate within. In fact, there are only seven places to transfer between systems in the entire region (Arts Center Station, Five Points Station, Civic Center Station, H.E. Holmes Station, Dunwoody Station, Airport Station, and Lindbergh Station), and this transfer is only coordinated between the suburban systems and the Metropolitan Atlanta Rapid Transit Authority (MARTA) – the major transit operator in Atlanta, with little coordination between the suburban operators. This fragmentation of transit services, which is based upon political jurisdictions, illustrates one of the most significant challenges facing the development of a true regional transit system in Atlanta – the need to develop structures for cooperation in the construction and/or operation of transit infrastructure and services that cross the political boundaries of the counties that make up the metropolitan region.

[1] Maria Saporta, "Transit fixes dependent on MARTA's inclusion," *The Atlanta Journal-Constitution*, Oct., 10, 2005.

LIST OF SYMBOLS OR ABBREVIATIONS

AADT – Average Annual Daily Traffic

ARC – Atlanta Regional Commission

BRB – British Rail Board

BRT – Bus Rapid Transit

BRU – Brussels International Airport

CAMPO – Capitol Area Metropolitan Planning Organization

CCT – Cobb Community Transit

CDG – Charles de Gaulle International Airport

CMSA – Consolidated Metropolitan Statistical Area

COG – Council of Governments

DART – Dallas Area Rapid Transit

DB – Deutsche Bahn

DBOM – Design/Build/Operate/Maintain

DCTA – Denton County Transportation Authority

DG-TREN – Directorate General for Energy and Transport

DOT – Department of Transportation

DOR – Department of Roads

DRJTBC – Delaware River Joint Toll Bridge Commission

DRPA – Delaware River Port Authority

EIB – European Investment Bank

EUKL – Eurostar United Kingdom, Ltd.

FHWA – Federal Highway Administration

FTA – Federal Transit Administration

GCT – Gwinnett County Transit

GDOT – Georgia Department of Transportation

GRTA – Georgia Regional Transportation Authority

HCTRA – Harris County Toll Road Authority

HOT – High Occupancy Toll

HOV – High Occupancy Vehicle

HST – High-Speed Train

ICE – InterCity Express

LINK – City of Denton, TX Transit

LGV – Ligne á grande vitesse

LRT – Light Rail Transit

MARTA – Metropolitan Atlanta Rapid Transit Authority

MBTA – Massachusetts Bay Transportation Authority

Metra – Northeast Illinois Commuter Railroad Corporation

Metro – Metropolitan Transit Authority of Harris County (Texas)

MSA – Metropolitan Statistical Area

MTA – Metropolitan Transit Authority (Nashville)

MTD – Miami-Dade Transit

NBI – National Bridge Inventory

NCTCOG – North Central Texas Council of Governments

NICTD – Northern Indiana Commuter Transportation District

NS – NeederlandsSpoorwagens

NTD – National Transit Database

PBKAL – Paris-Brussels-Koeln-Amsteram-London

PPP – Public Private Partnership

PTA – Piedmont Transportation Association

RRCS – Regional Rail Corridor Study

RTA – Regional Transportation Authority (Nashville)

RTD – Regional Transportation District (Denver)

RTI – Regional Transit Initiative

RTIA – Regional Transit Institutional Analysis

RTP – Regional Transportation Plan

SEPTA – Southeastern Pennsylvania Transportation Authority

SFRTA – South Florida Regional Transportation Authority

SNCB – Société Nationale de Chemins de feu de Belgique

SNCF – Société Nationale de Chemins de feu de France

TCRP – Transit Cooperative Research Program

TEA-21 – Transportation Equity Act of the 21st Century

TEE – Trans-European Express

TEN-T – TransEuropean Network – Transport

TGV – Train á grande vitesse

The T – Fort Worth Transportation Authority

TPB – Transit Planning Board

TRB – Transportation Research Board

TRE – Trinity Rail Express

Tri-Rail – Tri-County Railroad (see SFTRA)

TxDOT – Texas Department of Transportation

USDOT – United States Department of Transportation

VRE – Virginia Railway Express

SUMMARY

Construction and operation of cross-boundary transportation infrastructure is a challenge at the local, state, and international levels. Trends in travel patterns show increases in travel demand in both the United States and Europe resulting in greater attention to cross-boundary infrastructure and services. In the United States, this challenge has arisen most frequently in the provision of regional transit services and infrastructure while Europe is faced with a challenge of connecting its member-states. One question that remains unknown is whether when governments are faced with providing cross-boundary infrastructure or services, do they develop similar organizational arrangements when meeting these challenges regardless of what level of government is involved? This research asks whether governments at all levels of governance develop similar organizational solutions in the construction and operation of transport infrastructure.

This question is answered through an examination of regional transit provision in seven U.S. metropolitan areas, six commuter rail systems in the United States, a series of bi-state river highway bridges in the United States, and five cross-border segments of the Trans-European Transport Network in the European Union. Three similar organizational arrangements types were found to govern cross-boundary provision of transportation infrastructure and/or services. These three types: a third party entity, a contractual agreement, or fee for services, were found at all levels of governance. The research suggests that there is a relationship between the complexity of the service involved and the level of financial control indicating that more complex operations arranged as independent entities less complex services more direct public involvement.

INTRODUCTION

Out of all of the challenges faced when traveling, crossing oceans, passing over mountains, or bridging rivers, the artificial boundaries created by ourselves sometimes prove the most challenging to overcome. Political boundaries, whether international borders or municipal boundaries, define a government's reach and service delivery area, and, in the field of transportation, the responsibility for the transportation system. As communication and other technologies have improved, there has been a strong growth in travel demand, including a growth in demand for travel that crosses those political boundaries we have created. The challenges of cross-boundary travel is illustrated in the following three examples and shows the need to develop structures for cooperation in the provision of transportation infrastructure and services that cross the political boundaries.

In 1961, the Metropolitan Transit Commission in Atlanta published its report "Rapid Transit for Metropolitan Atlanta." This report presented a proposal for a rail-based rapid transit system centered upon Downtown Atlanta with branches extending throughout the current region to cities such as Avondale in Dekalb County, Norcross in Gwinnett County, Marietta in Cobb County, and Forest Park in Clayton County. This report was the third and final report of a series designed to layout a transportation investment plan for the Atlanta metropolitan region, including development of regional arterials, a system of freeways, access to the central core, and rapid transit. These documents, along with the previous 1946 Lochner Report, provided the basis for the modern Atlanta transportation system. There reports laid out the location of the freeway system and the present day heavy rail transit system in addition to forming the foundation of most major planning and construction efforts

While the challenges facing transit in the Atlanta metropolitan region may be unique, examining U.S. metropolitan regions reveals a different story. In 2000, the U.S. Census identified two hundred seventy-eight (278) consolidated or independent Metropolitan Statistical Areas (MSA) in the United States. Thirty-six (36) of those MSAs were considered by the census to be in more than one state.[2] Twenty-two (22) of these multi-state MSAs have a multi-state Metropolitan Planning Organization (MPO), the organization responsible for authorizing the transportation plan for its designated region. Table 1 lists these metropolitan areas and shows that they range from some of the most populous and important cities in the United States such as Washington D.C. and Chicago, to some of fastest growing areas of the country like Las Vegas, to smaller cities of regional importance such as Parkersburg, WV and Augusta, GA.

[2] *Census 2000 PHC-T-3. Ranking Tables for Metropolitan Areas: 1990 and 2000,* (Washington, D.C.: United States Census Bureau, 2001).

Table 1 – List of Bi-State MSAs in the United States

Metropolitan Statistical Area	States	2000 Population	Bi-State MPO
Augusta-Aiken	GA, SC	477,441	No
Boston-Worcester-Lawrence	MA, NH, ME, CT	5,819,100	No
Charlotte-Gastonia-Rock Hill	NC, SC	1,499,293	No
Chattanooga	TN, GA	465,161	Yes
Chicago-Gary-Kenosha	IL, IN, WI	9,157,540	No
Cincinnati-Hamilton	OH, KY, IN	1,979,202	Yes
Clarkville-Hopkinsville	TN, KY	207,033	No
Columbus	GA, AL	274,624	Yes
Cumberland	MD, WV	102,008	Yes
Davenport-Moline-Rock Island	IA, IL	359,062	Yes
Duluth-Superior	MN,WI	243,815	No
Evansville-Henderson	IN, KY	296,195	Yes
Fargo-Moorehead	ND, MN	174,367	Yes
Flagstaff	AZ, UT	122,366	No
Fort Smith	AR, OK	207,290	Yes
Grand Forks	ND, MN	124,345	Yes
Huntington-Ashland	WV, KY, OH	315,538	Yes
Johnson City-Kingsport-Bristol	TN, VA	480,091	No
Kansas City	MO, KS	1,776,062	Yes
La Crosse	WI, MN	126,838	Yes
Las Vegas	NV, AZ	1,563,282	No
Louisville	KY, IN	1,025,598	Yes
Memphis	TN, AR, MS	1,135,614	Yes
Minneapolis-St. Paul	MN-WI	2,968,806	No
New London - Norwich	CT, RI	293,566	
New York, Northern New Jersey, Long Island	NY, NJ, CT, PA	21,199,865	No
Norfolk-Virginia Beach, Newport News	VA, NC	1,569,541	No
Omaha	NE, IA	716,998	Yes
Parkersburg-Marietta	WV, OH	151,237	Yes
Philadelphia-Wilmington-Atlantic City	PA, NJ, DE, MD	6,188,463	Yes
Portland-Salem	OR, WA	2,265,223	Yes
Providence-Fall River-Warwick	RI, MA	1,188,613	No
Sioux City	IA, NE	124,130	Yes
Steubenville-Weirton	OH, WV	132,008	Yes
Washington-Baltimore	DC, MD, VA, WV	7,608,070	Yes
Wheeling	WV, OH	153,172	Yes

In addition to the usual local government coordination problems experienced by MPOs, bi-State MPOs also have to coordinate between two different states with potentially different priorities, attitudes and funding mechanisms for transportation projects. However, the problem of coordination is not limited to the United States.

Across the Atlantic, the European Union is facing a growing crisis of transport, particularly with the addition of twelve new members, ten in 2004 and two additional members in 2007. Freight traffic in the entire EU of 27 members is expected to increase by more than 66% between 2000 and 2020, while in the twelve (12) new members in Eastern and Central Europe alone, freight traffic is expected to more than double. Overall, the EU expects all traffic between all 27 members to double by 2020.[3] Recognizing this extraordinary growth in travel demand, the EU has embarked upon an ambitious plan to create a Trans-European Transport Network (TEN-T) covering the entire EU of 27 by 2020 representing an investment of over €600 billion. However, as the 2003 White Paper describes, one of the main obstacles to the completion of the TEN-T is the lack of progress on the cross-border segments between the member states of the EU.[4]

This dissertation examines whether the attempted organizational arrangements for provision of transportation infrastructure and services that cross political boundaries have similar characteristics at the local government, sub-national government, and national government levels. If this is the case, then areas or projects that are experiencing challenges of cross-border cooperation can legitimately examine cases from all levels of governance and not be limited to the experience of governments at their own level. For example, a metropolitan region made up of

[3] *Réseau Transeuropéene de Transport,* (Brussels: Direction générale de l'énergie et des Transport, 2005).
[4] *Report of the High Level Group on the Trans-European Network*, (Brussels: Directorate-General for Energy and Transport, June 27, 2003).

competing local governments struggling with how to arrange a regional rail system can turn to the experience of EU member-states because they have developed the high-speed train networks of the TEN-T. Alternatively, it will allow national governments to identify effective strategies from a much wider universe of examples by allowing an examination of successful cross-boundary projects and services without regard to the type of political boundary involved.

This dissertation is laid out in six chapters. Chapter 1 introduces the dissertation topic. Chapter 2 presents the context in which cross-boundary infrastructure should be considered in two sections through reviewing existing reports and articles in the transportation literature. The first section begins by examining some of the political challenges facing the United States regarding urban transportation planning and the challenges faced by the EU in encouraging the construction of a pan-European transport system followed by how these challenges are being met by mega-projects and the growth of Public-Private Partnerships (PPP), which have also been used to construct cross-boundary projects.

Chapter 3 is divided into two sections. The first section contains a definition of political levels that will be used throughout the dissertation to provide consistency during the examination process and a description of the research methodology. The second section is a description of the methodology used to examine four distinct types of cross-boundary infrastructures and services – metropolitan regional transit services in the United States, U.S. commuter rail systems, bi-state river bridges between U.S. states, and cross-border sections of the Trans-European Transport Network in the European Union. A rationale of why each of these types of cross-boundary infrastructure of services is provided and a description of how each specific case was

selected and examined. Chapter 4 presents each of the specific cases across the four types examined.

Chapter 5 presents the results of the case examination, including a description of general organizational arrangements found among each type. The general organizational arrangements are then compared across each type to see if there are similarities or differences between the types of arrangements for cross-boundary infrastructure and services across governance levels. Chapter 5 concludes with the results of interviews with selected individuals involved with cross-boundary projects regarding the results of the comparison. Finally Chapter 6 provides discussion of results from Chapter 5, recommending avenues for future research and presenting two short cases where the lessons learned can be applied to real cross-boundary challenges in 2006.

CHAPTER 2

CONTEXT: CROSS BOUNDARY ISSUES IN THE TRANSPORTATION FIELD

This chapter examines some research and problems currently engaging the transportation research community and how the challenges of providing cross-boundary transportation infrastructure and services relate to the current research activities. This chapter is divided into four sections. The first section examines several different areas in the United States that are experiencing challenges in the provision of cross-boundary transportation infrastructure and services. Whether it is from the growth of travel around the country and reduced investment to specific challenges in various metropolitan areas, cross-boundary challenges are becoming more noticed within the United States. The second section examines the challenges in the provision of cross-boundary transportation infrastructure as the EU expands into a union of 27 from a union of 15 within less than 5 years. Whether these challenges exist because of distorted investments as a result of the Cold War or a natural focus of investments within members rather than between members, the EU has identified the provision of cross-boundary transportation infrastructure and services as one of the largest challenges facing transportation in Europe. The last two sections explore two types of projects that cross-boundary projects frequently find themselves classified as – mega-projects and/or a PPPs. By examining these types of projects, and how infrastructure owners and operators have met the challenges of these projects, it is possible to see how the problem of providing cross-boundary transportation infrastructure and services has been met as part of the larger challenge of implementing a mega-project or PPP.

2.1 Challenges facing Metropolitan Regions in the United States

According to the Federal Highway Administration (FHWA), the United States saw an increase in vehicle miles traveled of 28.9% between 1990 and 2000 while total miles of the roadway network only increased by 2.1%. Additionally, adjusting for inflation, total U.S. expenditures per vehicle mile of highway travel by all levels of government were 54% of the level of highway expenditures in 1970.[5] The clear message is that the government is spending less on a crucial system that is seeing significant growth in demand.

In the United States, there has also been investigation into the operation of various organizations dealing with regional infrastructure planning and operation, with Miami providing a number of examples. Revell neatly traces the development of the fragmented sewage system in Miami and the challenges and attempts to reconcile the need of a regional sewage system, federal requirements, and infrastructure and operations divided among several distinct political entities.[6] In other research concerning regional transit in Miami, the poor relationship between county governments is explicitly called out as one of the major challenges to implementing regional transit in the Miami region.[7] Miami illustrates a clear example where a lack of effective organizational arrangements between governmental entities has hampered the development of efficient infrastructure, in this case water infrastructure, needed to serve the population living in the region. This pattern seems to be repeating itself in the same region with regards to the provision of transportation infrastructure and services.

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[5] *Our Nation's Highways.* (Washington, D.C.; Federal Highway Administration, 2000) 27-33.
[6] Keith Revell, "Piecing together Miami's Metropolitan Sewage System" in *Research in Urban Policy*, Vol. 7, 229 (Stamford, CT: JAI Press, 1998).
[7] Jill Strube, "Fragmentation and Mass Transit: Struggling to get Connected" in *Research in Urban Policy vol. 7*, 247 (Stamford, CT: JAI Press, 1998).

Recognizing the role of institutional barriers in implementing transportation projects, the Transit Cooperative Research Program (TCRP) of the Transportation Research Board (TRB) commissioned a report to specifically examine institutional barriers in the implementation of intermodal transportation projects, with a final report issued in 1993. This report indicated three primary types of institutional barriers: organizational, interjurisdictional, and resource.[8] While this report focused on issues between different levels of governance – such as between local planning agencies and State agencies – it did recognize the problem of intergovernmental conflict between neighboring jurisdictions. It is significant in that recognizing the institutional challenges for implementing transport projects, the TCRP Report explicitly identifies cross-boundary conflicts.

Kramer provides an excellent case example when exploring the challenges faced by the Capitol Area Metropolitan Planning Organization (CAMPO) that is the designated MPO for the Raleigh, NC urbanized area. CAMPO's jurisdiction is neighbored by the Durham-Chapel Hill-Carrboro (DCHC) MPO and while the population of the two areas almost functions as one urbanized area, there is no formal relationship between MPOs due to philosophical differences on land use and transportation and the fear that greater coordination would lead to a loss of influence in transportation planning for some jurisdictions.[9] Therefore, this area of North Carolina is experiencing challenges in meeting the demands placed upon its transportation system because of the way the institutions set up to plan and construct its transportation system are organized.

[8] Crain & Associates, *TCRP Report 14: Institutional Barriers to Intermodal Transportation Policies and Planning in Metropolitan Areas* (Washington, D.C.: National Academies Press, 1996)
[9] Jeff Kramer, "Organizational Review of the Capital Area MPO (CAMPO): A Case Example" presented at *Transportation Research Board 83rd Annual Meeting*, (Washington, D.C.: Transportation Research Board, 2004) 5-6.

Exploring MPO experiences a little further, Lewis and Sprague reveal the MPOs are usually one of four types:

1. A Council of Governments (COG) where each jurisdiction within the area is represented, usually with one vote per government regardless of population
2. A free-standing entity devoted to transportation planning whose board members are either appointed or are delegates to the appropriate COG
3. A division of county government if the planning area encompasses the entire planning area
4. A field office of transportation planners and engineers guided by and staffed by the state DOT[10]

Interestingly, they also found that the formation of regional organizations that were usually the predecessors to MPOs in California were spurred by fears that the California Legislature would impose regional governments; the legislature allowed regions to avoid regional governments if the cities within the proposed area voluntarily formed cooperative planning entities.[11] Nelson et al. began to probe the impact that MPO voting structures have on transportation investment decisions discovering that MPOs whose decisions are based upon the concept of one vote per entity, such as one vote per county or city as is common in the most common Council of Government MPO form, results in significant impact on transportation investment decisions especially regarding public transit investment levels.[12] What is intriguing

[10] Paul G. Lewis and Mary Sprague, *Federal Transportation Policy and the Role of Metropolitan Planning Organizations in California*, (San Francisco: Public Policy Institute of California, 1997) 34-35.
[11] Lewis and Sprague, 36.
[12] Arthur C. Nelson, Thomas W. Sanchez, James F. Wolf, and Mary Beth Farquhar, "Metropolitan Planning Organization Voting Structures and Transit Investment Bias: Preliminary Analysis with

about the composition of MPO members and distortions of voting rights is that these are the organizations that develop the transportation investment plans for their regions and therefore control the transportation planning process for determining which projects receive federal funds. What their composition reveals is that most voting members consists of governments at the same level of governance – i.e., they are made up primarily of local governments who share borders, but whose primary responsibilities lie within their jurisdiction and not with solving regional, cross-boundary problems. This could lead to instances where the responsible governments are concerned more with what occurs within their local border and ignore the challenges created by transport demand that enters or leaves their jurisdiction. In other words, the structure of regional transportation investment decision making could hamper local cross-boundary transport infrastructure and operation decisions.

In fact, two regions have explored transit institutional structures specifically because it was felt that the region's decision-making process was hindering regional, or cross-boundary, transit services and infrastructure. These regions are Dallas and Atlanta. Atlanta completed a one-year Regional Transit Institutional Analysis (RTIA) project in 2005 and created a Transit Planning Board (TPB) that is supposed to provide a basis for:

1. Coordinating transit services in the Atlanta metropolitan area
2. Identifying fundamental principles that support a future investment plan
3. Identifying a decision making structure for future investments
4. Increasing resources for existing and proposed services[13]

Social Equity Implications" presented at *Transportation Research Board 83rd Annual Meeting* (Washington, D.C.: Transportation Research Board, 2005) 7.

[13] *Revised Draft Agenda: Transit Planning Board* (Atlanta; Transit Planning Board, September 21, 2006) 1.

The TPB came about because the Atlanta region was facing some significant challenges in transit services, including limited service coordination between several different operators, distinct fare and funding structures among the existing transit operations, and general lower levels of funding for transit across the board.[14] In particular, the Atlanta Regional Commission (ARC), the designated MPO for the Atlanta region, had recently completed its 25-year Regional Transportation Plan (RTP) that included several major transit investment projects, but there was no clear vision about which agency would construct and operate these projects forcing the ARC to realize that the existing transit institutional structure in Atlanta was not capable of implementing the projects RTP, with the principal challenge resulting from each local operator being limited by the geographic boundaries of its local government service area.[15] For example, starting in the late 1980s, ARC studied alternatives for high capacity transit between the Cumberland activity center in Cobb County and the Perimeter activity center in Dekalb County that identified a strong need for some high capacity transit paralleling the northern portion of the orbital beltway (I-285).[16] However, this proposed transit line lies within three different counties which had two distinct transit providers. While the project continued to be identified as a needed investment for the region, it struggled to pass into the detailed planning phase. This failure to move forward resulted partly from the fact that the line passed through two distinct transit jurisdictions, with each of those jurisdictions having other investment priorities. Additionally, there was no clear understanding of which transit agency, or its parent county, would operate the service even if it was

[14] *Regional Transit Institutional Analysis Fact Sheet* (Atlanta; Atlanta Regional Commission, 2005).
[15] *Regional Transit Institutional Study Purpose* (Atlanta; Atlanta Regional Commission, 2004) 1.
[16] Manuel Padron & Associates, Inc and URS Corporation, Inc, *Regional Transit Action Plan – Technical Memorandum Number 3: Review of Previous Transit and Transportation Studies* (Atlanta; Georgia Regional Transportation Authority, 2003) 2-21.

constructed.[17] In other words, the Atlanta region could identify major needed transit investments but had no existing arrangement to coordinate cross-boundary transit infrastructure construction and operations.

Dallas embarked on the Regional Rail Corridor Study (RRCS) led by the North Central Texas Council of Governments (NCTCOG), the designated MPO for Dallas-Ft. Worth, designed to examine a regional rail service in partnership with the existing transit services then operating in the Dallas region. In parallel with an on-going Regional Transit Initiative (RTI), the project quickly identified institutional structures for transit as one of the major challenges facing the implementation of the regional rail in Dallas, particularly the limitation that existing transit operators must operate within specific jurisdictional boundaries.[18] The RTI effort identified five (5) families of institutional structures of transit operations within the United States:

1. Single Regional transit authorities that serve the entire region
2. Authorities that provide primarily single mode service
3. Regional authorities that provide planning and funding, but do not operate service
4. Sub regional authorities that work together through agreement
5. Transit agencies that serve only one city[19]

Much of the focus of the RRCS was on how to fund the regional rail services envisioned, an acknowledgement that funding and agreement on sharing of funds between to construct and operate the cross-boundary regional services, needed to be spelled out in a formal institutional framework. Dallas, like Atlanta, was able to

[17] Manuel Padron & Associates, Inc and URS Corporation, Inc, *Regional Transit Action Plan – Technical Memorandum Number 3: Review of Previous Transit and Transportation Studies* (Atlanta; Georgia Regional Transportation Authority, 2003) 2-5.
[18] *Regional Rail Corridor Study Report* (Dallas; North Central Texas Council of Governments, July 29, 2005) II-2.
[19] *Regional Rail Corridor Study Report,*VII-2.

identify needed regional transit infrastructure and operations and that it did not have the appropriate institutional structures to provide these services.

The U.S. experience clearly shows that needed cross-boundary investments, whether occurring because of new transit investment or two previously separate regions are merging into one region, are being hampered by the organizational arrangements that inhibit cross-boundary investments from being considered through a focus on political jurisdictions or the simple non-existence of organizational arrangements to even construct and operate the needed transport investments.

2.2 Challenges Facing the European Union

The need for and research into creating pan-European services has been around since the creation of the EU itself. The Treaty of Rome (1957) establishes that the EU, at the time the European Economic Community, has the responsibility for the establishment of a common transport policy.[20] This treaty specifically spells out procedures (mostly regarding to regulation of transport policies and tariff rates and even though the Land Transport Committee to coordinate development between member states was only established in 1978), and it establishes the goal of "promot[ing] the free flow of goods and people throughout the Union,"[21] providing the basis for designating responsibility of transport to the EU Commission and, therefore, the Commission oversight of the TEN-T.[22]

At the same time as the Treaty of Rome, there were ongoing efforts to establish a more unified EU rail network through the development of the TransEuropean Express (TEE) trains. As Chapman reported, the national railways

[20] Article 3(e) *Treaty of Rome* 1957
[21] *Treaty of Rome*, 1957
[22] Sheila Farrel, *Financing European Transport Infrastructure: Policies and Practice in Western Europe, (*Houndmills, Basingstoke, Hamphire, UK: Macmillan Press, Ltd. 1999).

companies of the Netherlands, Belgium, Luxembourg, West Germany, France, Switzerland, and Italy had formed the *Groupement TransEurop Express* in 1957 to provide coordinated service between their respective networks.[23] Out of the TEE network grew the familiar EuroCity Trains that still ply the railways of western Europe today linking Brussels to Zurich and Basel, Hamburg to Milan, and so on.[24] Finally, efforts to establish more coordinated rail services, at least in western Europe, continued with travel between the RANDSTAD, the fastest growing region in Netherlands in the late 1960s, and area around Antwerp – Gent – Bruges, Belgium's fastest growing region at the time, being specifically mentioned in the Dutch National Plan of 1969 as well as continuing efforts to develop better links between Paris and Brussels through the Europolitan train in the early 1970s.[25],[26]

In November of 1993, the EU members adopted a new governing treaty that fundamentally changed the character of the EU and brought about many radical changes including the realization of monetary union. For this dissertation, the adoption of the Maastricht Treaty also meant that the European Commission gained the responsibility for implementation of trans-European networks for energy, transport, and communication commensurate with the EU's goal of providing for the free flow of information, people, and ideas between member states.[27] Accordingly, in 1996, a series of projects was developed to form the core of the trans-European Transport Network (TEN-T) in Essen, and commonly referred to as the Essen

[23] Albert S. Chapman, "Trans Europ Express: Overall Travel Time in Competition for Passengers," *Economic Geography*, 44, no. 4 (1968).
[24] *Villes d'Europe : Prix et horaires du 26.06.2005 au 10.12.2005*, ed. Daniel Desnyder (Brussels: Société National de Chemins de feu de Belgique, 2005), 28.
[25] Ronald H. Buchanan, "Toward Netherlands 2000: The Dutch National Plan," *Economic Geography*, 45, no. 3 (1969).
[26] Herman Welter, *TGV & Chunnel* (Leuven: Davidsfon, 1993), 40.
[27] *Treaty of the European Union*, 1992, also known as the *Maastricht Treaty*

Projects.[28] A subsequent update at the Dublin conference added some additional projects to the TEN-T and therefore the initial list of priority projects for the TEN-T are commonly referred to as the Essen projects or the Essen / Dublin projects.

The challenges facing the implementation of a European Transport network are well documented. Turro presents one of the more comprehensive examinations of the challenges including technological, political, and financial facing the construction of the TEN-T as envisioned by the Maastricht treaty. Political action across traditional national boundaries both for funding, planning, and construction area highlighted as two of the most important actions needed to face the challenge of completing the TEN-T.[29]

In 2001, the Directorate General for Energy and Transport of the European Commission (DG-TREN) issued a white paper on transport called "European transport policy for 2010: Time to Decide" that is more commonly known as the Van Miert memo after Karl Van Miert who chaired the group creating the white paper. According to the report, over 10% of the motorway network experiences daily traffic jams, 20% of the railway network is congested, and over 30% of flights at the 16 major European airports have more than a quarter hour of delays. The costs of congestion on all parts of the trans-European Network according to the report is projected to grow to more than 1% of the EU-15 GDP in 2010, or approximately €Billion annually. The white paper also stresses the importance of the use of transport links in the integration of the enlarged EU.[30] To combat this challenge of increasing capacity on the transport network and integration of the new member

[28] *Presidency Conclusions: European Council Meeting on 9 and 10 December 1994 in Essen* (http://ue.eu.int/ueDocs/cms_Data/docs/pressData/en/ec/00300-1.EN4.htm, Annex 1 (Last accessed: November 26, 2006).
[29] Mateu Turro, *Going trans-European*, (Amsterdam: Pergamon, 1999).
[30] *European Transport Policy 2010: Time to Decide*, (Luxembourg: Official Publications of the European Communities, 2001) 11.

states, the EU Commission anticipates spending €225 billion on the 30 priority projects with the great bulk being spent between 2007 and 2013 when the Commission anticipates spending €140 billion.[31]

On the operational side, the EU Commission is going ahead with liberalization in the transport market. Following the liberalization of the internal airline market and road haulage, by 2008, the Third European Rail Directive aims to have an open market in international passenger travel within the EU. Currently, an international rail carrier must carry a passenger outside of the country of boarding; however, this directive would allow operators to pick-up and drop-off passengers within the same country even if they are not the national operator of the system.[32] Clearly, the member states of the EU have and are struggling over how to create a unified, continental transport system with cross-boundary issues playing a significant role in the delay of the development of the system.

2.3 Mega-Projects

"Mega-Project" is a term that is frequently heard with regard to expensive and high visibility projects. Three projects sometimes mentioned as mega-projects in the United States are the Central Artery/Tunnel project in Boston, the Denver International Airport, and the Woodrow Wilson Bridge in Washington, D.C. However, what exactly is a mega-project? Are they merely expensive projects or is there another defining feature? Feitelson and Salomon define mega-projects through benefit uncertainty. They differentiate cost uncertainty from benefit uncertainty by suggesting that the level of technological innovation and system effects of a project are what differentiate a mega-project from merely a costly project. Under this

[31] Jacques Barrot, "Financement des réseaux transeuropéens de transport et d'énergie" Speech/05/642 to the European Parliament. (Strasbourg: European Parliament, October 25, 2005).
[32] *IP/04/291* (Brussels: European Commission, 3 March 2004)

definition projects such as the French TGV-Network and the Channel Tunnel are true mega projects because of their technical innovation and overall system effects whereas projects such as the Big-Dig, Woodrow Wilson Bridge and Denver International Airport would be defined by Feitelson and Salomon as merely costly projects because most of the technologies used are relatively well-known, but applied on a larger scale.[33] While they engage in an interesting exercise in attempting to define mega-projects, Feitelson and Salomon neglect to define when a technology moves from being innovative and benefit-uncertainty, to being a well-defined technology. Therefore, a more appropriate definition is provided by Altshuler and Luberhoff, who explicitly define mega-projects as those costing more than $250 million (adjusted to 2002 U.S. dollars).[34] Therefore, this dissertation uses the Altshuler and Luberhoff definition of a mega-project it provides a clear cut definition of what is and what is not a mega-project.

Using the Altshuler and Luberhoff definition, many current transportation projects are mega-projects, including such varied projects as[35]:

- Brussels – Liege – Cologne High Speed Rail line ($3.19 billion)[36]
- Woodrow Wilson Bridge ($2.38 billion)[37]
- Second Mainline Tri-Rail Track ($318 million)[38]
- Denver Southeast Corridor LRT ($837 million)[39]

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[33] Eram Feitelson and Ilan Salomon. "Transportation Mega-projects: On the Importance of Definitions." Presentation at the NECTAR Conference, Las Palmas, Gran Canaria. June 3, 2005.
[34] Alan Altshuler and David Luberhoff, *Mega-Projects: The Changing Politics of Urban Public Investment*, (Washington, D.C.: Brookings Institute Press, 2003).
[35] All values in 2002 Dollars using the Consumer Price Index
[36] *Réseau Transeuropéene de Transport*, (Direction générale de l'énergie et des Transport, 2005)
[37] Robert D. Douglass, Shirlene Cleveland, Robert J. Healy and Thomas E. Mohler, "Adventures in Building Another Washington Monument" presented at *Transportation Research Board 83rd Annual Meeting* (Washington, D.C.: Transportation Research Board, 2004) 2.
[38] *Annual Report on New Starts: Proposed Allocations of Funds for Fiscal Year 2005*, (U.S. Department of Transportation: Federal Transit Administration (FTA-TBP10-2004-1). 2004).
[39] *Annual Report on New Starts: Proposed Allocations of Funds for Fiscal Year 2005*, (U.S. Department of Transportation: Federal Transit Administration (FTA-TBP10-2004-1), 2004).

Each of these projects is clearly within the definition of a mega-project using the established definition, even though each of these projects has a very distinct purpose. The Brussels – Cologne HST is part of the growing network of high speed trains in northern Europe and is specifically designed to accommodate intercity and long-distance travelers in competition with air passenger service. The Woodrow Wilson Bridge is a replacement facility for a functionally obsolete bridge over the Potomac River that serves as a commuter route as well as a major link of the national highway network along the Eastern Seaboard. The construction of a second main-line track for Tri-Rail in southeastern Florida and the Denver Southeast Corridor Light Rail Transit (LRT) on the other hand are designed to provide intra-regional transportation and the primary benefits are to the Miami/Ft. Lauderdale and Denver regions respectively. However, each of these projects do have another thing in common other than their cost – they each required cooperation of governments at the same level of governance to be accomplished – the nations of Belgium and Germany for the Brussels – Cologne Line, the states of Maryland and Virginia and the District of Columbia for the Woodrow Wilson Bridge, the counties of Dade, Broward, and Palm Beach for the Tri-Rail construction, and counties of Douglas and Arapahoe for the Southeast Corridor LRT. Therefore, part of the process of figuring out how to construct and operate mega-projects will likely involve resolving cross-boundary challenges.

2.4 Public Private Partnerships

Finally, as a result of continuing growth in demand for travel and shrinking resources from the public sector with which to meet that travel demand there is a growing and continuing interest within both the United States and Europe in

increasing the role of the private sector in the provision of transport infrastructure – most commonly through the form known as a Public-Private Partnership (PPP). While private development of transportation infrastructure in not new, it has not been the primary way of funding and running transport infrastructure since the end of WWII – with a few exceptions. France, as chronicled by Dunn, attempted to build dedicated and free motorways through dedicated motor fuel taxes, but was resisted by the Finance Ministry and instead ended up with a series of national motorways that is over 70% controlled by toll companies, seven (7) of which are designated as "mixed-economy" companies, similar to authorities in the United States, and one completely private concessionaire.[40] Debande provides a succinct explanation of how a concession works – the public owners gets the private financiers to develop the infrastructure while never explicitly giving up ownership of the infrastructure in return for a guarantee that the private financiers will be the only entity to operate the infrastructure for the set period of time – usually a lengthy time period such as 30-50 years.[41] Debande also points that initial public involvement usually came in the form of land grants and was usually not instigated by the public entities themselves – one particular exception being the Belgian government's involvement in constructing the first rail line in the country between Brussels and Mechelen.

Since the 1990s, Australia has been at the forefront of launching public-private initiatives, with such initiatives in fact leading to the development of sophisticated financial firms that are able to compete on a global scale. In fact, two of the largest firms in Australia, Macquarie Bank and Transurban, are major infrastructure concessionaires and have leveraged their expertise in infrastructure management

[40] James A. Dunn, Jr., "The French Highway Lobby: A Case Study in State-Society Relations and Policymaking," *Comparative Politics, 27 no. 3*, (New York: City University of New York, 1995) 279.
[41] Olivier Débande, "Le rôle du secteur privé dans le financement des infrastructures : une mise en perspective historique,'' *Revue économique 48, no. 2*, (Paris : Presses de Sciences Po, 1997) 197.

gained in Australia to expand abroad. At Macquarie, infrastructure management, part of the group's Investment Banking Division, purchased Copenhagen Airport in 2005, participated in group financing of a new expressway in Malaysia, was a part of consortium to purchase the Paris-Rhin-Rhone motorway in France, and, in the United States continued to manage or explored purchasing of the Indiana Toll Road and Dulles Greenway.[42] Transurban has expanded into the U.S. market purchasing the Pocahontas Parkway in Richmond, VA and actively pursuing HOT-lane development as part of a PPP on the Virginia portion of the Capital Beltway and a section of I-95/395 in Washington, D.C.[43] The Australians have gained their international role in the financing and managing of infrastructure through PPPs through a comparatively long history of PPPs, especially in motorway development. In Victoria, CityLink – a 12-mile project of urban freeways – was granted to a concessionaire for a period of 34-years to construct, operate and maintain the infrastructure, including the collecting of tolls. The concessionaire in this case reports directly to VicRoads, the provincial road owner. The other major roadway project in Victoria handled by PPP, Eastlink, consists of a 28-mile freeway project for a 38-year concession period, though in this case the concessionaire reports to a distinct authority, the Southern and Eastern Integrated Transport Authority, specifically set up to manage EastLink.[44] Aside from CityLink and EastLink in Victoria, other major motorway PPP projects in Australia have been Cross City Tunnel, Lane Cove Tunnel, M7 motorway and M2 motorway in

[42] *Macquarie Bank: 2006 Annual Review*. (Sydney; Macquarie Bank, 2006) 13.
[43] *Transurban-Overview* (Melbourne; Transurban, 2006) http://www.transurban.com.au/transurban_online/tu_nav_black.nsf/childdocs/-2E8F49362850990ACA25703F00115391-246CD9023FA5C35BCA25719D0003928D?open (Last Accessed: September 30, 2006).
[44] Geiger et al. *Transportation Asset Management in Australia, Canada, England, and New Zealand*, FHWA Report No. FHWA-PL-05-019 (Alexandria, VA; American Trade Initiatives, November 2005) 70-73

Sydney.[45] The Australians, through companies such as Macquarie and Transurban, have begun to parlay their experiences in Australia into expansion into PPPs throughout Europe and United States and it is likely that any major roadway PPPs competition will involve an Australian company or its partners in the United States in the coming years.

Sytze and Nijkamp list two important conditions that must be met for the private sector to be involved in developing transport infrastructure:

1. The private sector should take the risks of investments.
2. User charges should be levied.

These conditions are necessary to avoid having the private sector pass on any inefficiencies or deficits to the public sector.[46] Roll and Verbeke examine current funding strategies for the financing of European High Speed Train network discovering that direct government financing of the networks is occurring at around 40% of the project costs, with the exception of France and Italy where the national rail infrastructure owner is self-financing, and the private funds are most useful in those areas where EU funding can be leveraged.[47] However, as Ross noted, historically in Europe most rail and other infrastructure investment has been by state-owned companies more interested in unifying the country and therefore, more focused on national investment goals rather than operating from an European perspective.[48] Therefore, the European Union has turned in large part to PPP ventures to finance the construction of the TEN-T with projects such as the Oresund Fixed Link between

[45] Michael West "Toll road financing flawed: academic," in *The Australian* (Sydney; The Australian, September 27, 2006) http://www.theaustralian.news.com.au/story/0,20867,2048145-643,00.html (last accessed September 28, 2006).
[46] Sytze A. Rienstra and Peter Nijkamp, "Lessons from Private Financing of Transportation Infrastructure: Dutch Infrastructure in the 19th Century and European Projects in the 20th Century," *Révue economique, 48 no. 2*, (Paris: Presses de Sciences Po, 1997), 231.
[47] Martin Roll and Alain Verbeke, "Financing of the Trans-European High-Speed Rail Network," *European Management Journal, 16 no. 6*, (Great Britain: Elsevier Science, Ltd., 1998), 706.
[48] John F.L. Ross, "High Speed Rail: Catalyst for European Integration?" *Journal of Common Market Studies, 32, no.2*, (London, Blackwell Publishing, Ltd., 1994) 132.

Denmark and Sweden, the new Brenner Rail Tunnel between Austria and Italy as part of a Berlin – Milan rail line, and the rail connection between France and Spain over the eastern Pyrenees each being some form of PPP. The EU is keen on using the European Investment Bank (EIB) to increase the completion rate of the TEN-T leading to the development of specialized financial instruments such as the "TEN Investment Facility" specifically designed to strengthen development of the TEN and increase private sector participation.[49]

While intriguing, the question remains how do PPPs relate to cross-boundary infrastructure projects? Why would PPPs be interested in organizational arrangements for the construction of cross-boundary transport infrastructure and services? First, the French motorway experience shows that, in some cases, there is likely to be long-term concessionaire contracts provided to the private operators meaning that private operators are going to be cooperating closely with public transport entities, whether highway departments or political interests for a significant period of time. Secondly, since the EU in particular is trying to encourage the use of PPPs to construct those parts of the TEN-T that are not progressing as quickly, and since most of those projects are cross-boundary projects, many of the new PPPs, particularly those involved in TEN-T projects will face, at some point, cross-boundary challenges. Finally, in the case of TEN-T and possibly Atlanta, some entities are using PPPs for the provision of cross-boundary infrastructure. For example, the Oresund Bridge, new Brenner Tunnel, and the international portion of the Lyon-Turin LGV are or were constructed by some form of PPP. In Atlanta, the Georgia DOT is considering a PPP for the construction of HOT/BRT lanes along the northern portion of its beltway, a project whose need has been recognized, but required the cooperation

[49] T.C. Barrett, "EIB Experience in Financing Trans-European Networks and Public Private Partnerships" presentation give February 10, 2005, (Moscow: European Investment Bank, 2005).

of three counties. Therefore, knowledge of how to arrange construction and operation of cross-boundary infrastructure projects will help develop more effective PPP organizations and ease their implementation. Additionally, if governments turn towards a PPP model for constructing cross-boundary infrastructure, knowledge of existing PPP providers and the lessons of more developed PPP projects will help governments craft more effective concession contracts.

2.5 Defining the Question

One of themes running through all the topics discussed so far is the need for cross-boundary cooperation. Cross-boundary arrangements can be a primary challenge – as in the case of developing regional transit infrastructure in Dallas and Atlanta – or it can be a minor theme worthy of keeping in mind, as in the case of the construction of the Brenner Tunnel between Austria and Italy, where the primary challenge is how to operate the tunnel boring machine. However, even despite the wide ranging responsibilities that these different levels of governments have, one of the challenges facing many major transport investment projects – whether in the United States or Europe, dealing with mega-projects or new Public-Private Partnerships – is how to structure organizational arrangements for those projects that cross political boundaries. Recognizing different roles each level of government provides, ranging from national security for national governments to water systems for local governments, there are potentially areas where each level of government does reach the same result. What remains unknown right now is whether for transport projects and services are there differences about how to solve cross-boundary challenges at local, national, and international levels of governance, or when presented with the same type of problem and challenges, do these different levels of

governance identify similar solutions. In other words, can the lessons learned as the EU progresses with the cross-boundary projects TEN-T be applied to challenges of regional transit coordination in Atlanta and Dallas? That is the question, whether governments at all levels of governance develop similar organizational arrangements in the construction and operation of transport infrastructure that cross political boundaries, that this dissertation seeks to answer.

CHAPTER 3

BACKGROUND DEFINITIONS AND METHODOLOGY

This chapter consists of three main parts. The first part defines the level of governances considered throughout the rest of the dissertation. The second part lays out the methodology for examining cross-boundary infrastructure and services. The methodology begins by discussing the four types of projects examined and why those types of projects were selected. Then an explanation of how each of four types of projects was examined is provided. The final part of the chapter consists of two sections that explain how the analysis was conducted and the framework for the discussion.

3.1 Definition of Levels of Governance

This section provides a standard definition for levels of governance to be used throughout the dissertation. There is typically one level of government that sponsors or determines the need for pieces of cross-boundary physical infrastructure or services such as a bridge or rail line. In some cases, the need for an infrastructure segment or link has been determined to exist by a higher government entity above the two governmental entities involved, but this higher entity either does not have the power or does not wish to construct the infrastructure on its own recognizance.

For example, the European Union (EU), a supra-national government, has identified the need for additional transport infrastructure to achieve its goals of the free movement of goods and people and several of these infrastructure projects require new infrastructure between the independent nations (hereafter referred to as

member states when referring to members of the EU) that make up the EU. Because it could quickly get confusing reading sentences such as "a government entity above the entities involved," the following definitions of political levels will be used for clarity and consistency:

Type A – Supranational Level: Governmental entities and organizations at this level are located above nation states and are formed by agreements between nation states. The European Union (EU) is the most prominent and developed example of this type of government, but others that are considered similar in type are Mercosur – an association of South American nations roughly based on the EU model, the Association of South-East Asian Nations (ASEAN), and the New Partnership for African Development (NEPAD).

Type B – Nation State: The commonly identified state such as the United States, United Kingdom, Japan, or India. This level includes all independent governments that are considered sovereign entities and are responsible for issuing of passports, military defense, and basic governmental organization.

Type C – Large Regional Government: This level of government entity is below the nation state, but still has considerable powers regarding provisions of services. These entities are usually found in federal nations or confederations such as the United States, Brazil, India, and Russia. Examples of this type of government include the U.S. federal states, Laender in Germany and Austria, provinces in Canada, and regions in Belgium.

Type D – Small Regional Government: These governmental entities are weaker than Type C governmental agencies with less responsibility for provision of state type services such as health care and are more prominent in local affairs. These are commonly found in more centralized states such as regions in France or the

District of Columbia in the United States or as regional governments within Type C entities such as Metropolitan Planning Organizations (MPO) in the United States or Verkhersverbunds in Germany.

Type E – Large local governments: these governmental entities are not common and are found most frequently in the United States as counties or parishes (in Louisiana). These governments generally cover areas that are not incorporated into cities or municipalities and provide local government services for supposedly non-urban areas.

Type F – Cities/Municipalities: These are the urban governments that are most commonly referred to as incorporated cities.

Table 2 – Levels of Governance

A	**Supranational –** Entities above the nation-state that are usually composed of nation-states and created by treaties. The most prominent example is the European Union, but Mercosur, ASEAN, and NAFTA are also examples
B	**Nation State** – Entities that are usually called counties such as the United States, France or South Africa. They are the entities that issue passports, are responsible for national defense, etc.
C	**Large Regional** – Sub-national entities that still have considerable powers and are usually found in confederal or federal nation states. Examples are U.S. States, German and Austrian Laender, and Canadian and Australian provinces
D	**Small Regional** – Sub-national entities that are weaker than those entities found in confederal or federal states, or entities in a Type C entity such as a metropolitan area government. Examples include French départements or U.S. MPOs
E	**Large Local** – Sub-divisions of type C or D entities that are not municipalities such as U.S. counties or townships.
F	**Cities / Municipalities** – The local government entity usually referred to as an incorporated city or municipality. They usually provide such basic services as trash pick-up, water services, etc.

3.2 Research Methodology

This section presents how the cases in Chapter 4 were selected and examined. There are several potential methods to examine cross-boundary projects. One way would be to conduct a review of all available academic research in the literature on cross-boundary organizational arrangements. However, this approach would yield academic theories and most likely delve heavily into the realm of political science and public policy while potentially ignoring what has actually gone on in the practicing world. Another approach would be to develop a scanning tour, similar to ones performed by the FHWA on Asset Management, and visit various places involved dealing with cross-boundary issues and interview individuals involved in resolving cross-boundary challenges. This approach, while comprehensive, is quite formidable in terms of cost and time commitments making this approach infeasible. Another way to examine the organizations that construct and operate cross boundary projects at different levels of government, is to conduct a literature and web survey of different types of infrastructure and / or operations that involve cross boundary travel. This approach, combining readings from the academy while still grounding the examination firmly in the real-world environments, is the approach taken in this dissertation. Since list of potential projects is significant, four areas were identified that contained similar projects facing cross-boundary issues and were selected for examination:

- Selected U.S. Metropolitan Region Transit Systems
- U.S. Commuter Rail Systems
- Bridges that cross rivers function as the border between two U.S. states
- Cross border projects of the European Union's TEN-T program

3.2.1 Selection

3.2.1.1 U.S. Metropolitan Region Transit Systems

U.S. metropolitan transit areas were selected using the following criteria:

1. Metro Region population over 1 million
2. Increase in population > 500,000 between 1990 and 2000
3. Growth rate over 15% between 1990 and 2000
4. Contained within one state

Metropolitan areas were defined by the 2000 U.S. Census. Limiting the selection to those areas with a population over 1 million is designed to ensure that all major U.S. cities are included and to eliminate those cities that potentially do not have transit service. An increase in population over ½ million people in the period between 1990 and 2000 is designed to select those cities that are experiencing the influx of a large number of people. Selection of a growth rate over 15% is designed to select those cities that are experiencing not only the influx of a large number of people, but also experiencing a large increase relative to their base population. These two criteria – increases in absolute population and relative population – are designed to identify those areas that are potentially struggling with investing in new transport infrastructure and with the incorporation of newly developed areas into the metropolitan area. The final selection criteria, the metropolitan area is contained within one state, is designed to make sure the examination focuses on organizations at the Type D, E and F levels without influences from organizations at the Type C level. Out of a total of fifty (50) MSAs with a population of over 1 million, seven (7) were selected for closer examination – Atlanta, Denver, Dallas/Ft. Worth, Houston, Miami, Phoenix, and Seattle. In 2000, these seven MSAs had a population of just over 27 million people, representing about 10% of the U.S. total population.

3.2.1.2 Commuter Rail Systems

U.S. Commuter rail systems were selected for three reasons. First, because of their large capital investment requirements, standardized information about the systems is usually available from the Federal Transit Administration (FTA). Secondly, because of the nature of commuter rail travel – longer average trip lengths than other urban transit trips – there are likely to be cross-boundary issues involved in the construction and operation of a commuter rail system at all levels of governance between Type C and Type F. This allows an examination of whether the involvement of Type C governments changes significantly the types of organizations involved in constructing and operating regional transit systems since most commuter rail systems operate as part of a well defined region. Finally, out of the seventeen (17) commuter rail systems in operation in the United States in 2005, eight (8) have started within the past 20 years and with two starting up in 2006 – Albuquerque and Nashville – meaning that there should potentially be a significant amount of information available about the negotiations and background surrounding the construction, implementation, and operation of these new systems.

3.2.1.3 Bi-State River Bridges

River bridges between U.S. states were selected for examination for several reasons. First, rivers are frequently used as boundaries between states and, as such, bridges present an opportunity to examine if there are organizations that develop exclusively between Type C governments. Second, it is possible to verify the existence of bridges through examination of aerial photographs. Next, while there are multiple roads that cross between neighboring states, a bridge requires on-going

maintenance and is frequently such a large investment that information is usually available in the form of legal agreements over who builds, operates, and/or maintains the bridge, information that is not always available for surface roads. These bridges are also supposed to be coded and recorded as part of the National Bridge Inventory compiled by the Office of Bridge Technology at the Federal Highway Administration. Additionally, whereas the previous efforts has focused more on transit and rail infrastructure because of the more readily available information, bridges present an opportunity to examine cross boundary road infrastructure in a manageable fashion. Finally, the bridges involved represent the range of roadway infrastructure from major bridges that are critical to the national transport system such as the Hernando DeSoto Bridge over the Mississippi between Tennessee and Arkansas in Memphis to local bridges such as the County Road Z Bridge between Michigan and Wisconsin over the Menominee River near Nathan, Michigan.

3.2.1.4 Trans-European Transport Network

The final group of projects examined are the cross boundary projects identified in the Trans-European Network Transport (TEN-T) priority axes and projects. The European Union has identified a network of thirty (30) corridors throughout the 27-member states of the EU. Out of the one hundred and twenty (120) identified project segments of these corridors, forty-three (43), or over 1/3 of these projects, involve a cross boundary segment between EU member states.[50] These projects were selected because of the availability of the information regarding these projects and also since this is probably the most comprehensive and coordinated effort

[50] *Trans-European Transport Network: TEN-T priority axes and projects 2005*, (Luxembourg: Office for the Official Publications of the European Communities, 2005).

to construct network infrastructure between traditional nation states and therefore present an opportunity to examine whether there are organizations that develop exclusively between Type B governments.

3.2.3 Examination Process

3.2.3.1 Metropolitan Region Transit Systems

The metropolitan areas were selected using the U.S. Census 2000 information allowing for a consistent definition of a metropolitan area yielding seven metropolitan areas: Atlanta, Dallas, Denver, Houston, Miami, Phoenix, and Seattle. Once the areas were identified, all transit operators that operated fixed route service (bus, light rail, heavy rail, AGT, monorail, and commuter rail) were identified using the 2004 National Transit Database (NTD).[51] The NTD yields information on the size, in terms of passenger trips and Vehicle Miles traveled, and organization of each system. A visit to each of the identified transit system's website was then conducted to determine information such as size of the service area and additional background information about the history of the organization. Information on how these systems interacted with others in the region was gleaned from information provided by the transit systems as well as information from the related Metropolitan Planning Organizations responsible for transport planning in the metropolitan area. As needed, additional information was collected from other governmental documents, articles in the transport engineering and planning field, and through the main stream press. Once this information was compiled a short summary of how the different transit agencies operating within region interacted with each could be developed.

[51] *2004 National Transit Database* (Washington, D.C.: Federal Transit Administration, 2005)

3.2.3.2 Commuter Rail Systems

A list of the commuter rail systems operating in the United States was compiled through the National Transit Database which includes information on organizational structure of the operating agency and how the service is provided (i.e. directly operated or contracted out to a third party operator). Additionally, other sources indicated that two new commuter rail systems were about to start service in 2006 and it was decided to include those systems in the examination as well since the organizational and operational details of these systems should be well developed.[52],[53] An overview of most of all of the existing commuter rail organizations was developed using the NTD information, excluding the two new start-up agencies. A more detailed examination of the operations and organizational structure of six commuter rail agencies was developed using the contact information provided by the NTD. Information about the organization and operation of the commuter rail operators, such as where the system is allowed to operated, ownership of rolling stock and other infrastructure, and agreements or lack-thereof with other transit operators, was collected primarily from the operators themselves. Additional information in general transportation planning and engineering literature, environmental and planning studies, and the general press was also used to complete an examination of these systems. In order to see if there were interesting differences between commuter rail operations that were started by private railroads and those commuter rail systems that have started since 1987 as publicly owned systems, three of the systems examined were operations that began after 1987, while the other three agencies operate services that were originally established as private commuter rail services. The three pre-1987

[52] *Music City State East Corridor Commuter Rail Service Business Plan* (Nashville: East Corridor Oversight Committee, 2005) 4.
[53] *Belen to Santa Fe Commuter Rail Project Overview and Status of Project Elements Revised April 11, 2006*, (Albuquerque: New Mexico Department of Transportation, 2006) 3.

services are Tri-Rail in Miami, Music City Star in Nashville, and Virginia Railway Express in Northern Virginia. The three services that originally began as privately operated commuter rail services are the Massachusetts Bay Transportation Authority in Boston, the Southeastern Pennsylvania Transportation Authority in Philadelphia, and the Northern Indiana Commuter Transportation District between Northern Indiana and Chicago.

3.2.3.3 U.S. Bi-State River Bridges

Unlike the previous types of projects, there is no publicly available discrete list of cross state border bridges. While it might be possible to compile a list of bridges through contacting each of the states in involved, this would not provide a consistent method of discovering how many interstate river bridges are present in the United States since each state would have their own methodology for collecting and distributing information. Therefore, an inventory of bridges was compiled using aerial and satellite photographs through computer program Google Earth© to provide a consistent and single method of compiling a list of interstate river bridges in the United States This survey of aerial imagery was conducted by setting the eye-elevation between 10,000 and 15,000, depending on the size of the river, and moving the photograph slowly along the river noting the location and road carried by each bridge encountered over all rivers that form state boundaries in the United States Once this inventory via aerial photographs was complete, this list was compared with the National Bridge Inventory (NBI) Data of 2004 provided by the Federal Highway Administration, which should have a complete list of all bridges located within the United States including whether those bridges are shared with a neighboring state.

Several potential processes for examining the cross-border bridges were considered. Since this inventory of interstate river bridges is likely to yield a large number of bridges, it is necessary to come up with a way to select bridges for examination. It might make sense to focus exclusively on bridges that are part of the Interstate Highway System since this system carries 24.1% of all traffic on the nation's roadway network despite representing only 1.2% of all roadway miles in the nation.[54] However, the interstate highway system was funded primarily through the federal gas tax at 90% and this funding mechanism could perhaps skew the results since much of the system was constructed in the same manner.[55] However, this approach would still yield an examination of nearly two hundred bridges and in the interest of examining a representative sample of bridges from around the nation, bridges selected for closer examination are those bridges on the interstate system or U.S. numbered route system that cross the Ohio River or the Mississippi River below the Wisconsin state line. This allows for an examination of fifty-one bridges completed both before and after the construction of the interstate system, an examination of bridges in two different major regions of the country – the South and Midwest, while limiting the number of states involved to eleven (West Virginia, Ohio, Kentucky, Indiana, Illinois, Iowa, Missouri, Arkansas, Tennessee, Louisiana, and Mississippi). Unfortunately, due to data quality of the NBI this approach was also not feasible.

The final method for examining was using bridges that were able to be confirmed as cross-state bridges using both the list compiled from satellite and aerial photography and the NBI Data and these were placed on a master list of cross-state border bridges. Using this double confirmation did have the unfortunate effect of

[54] *Our Nation's Highways*. Federal Highway Administration. Washington, D.C. 2000
[55] Richard F. Wiengroff, "Federal-Aid Highway Act of 1956: Creating the Interstate System," *Public Roads, 60, no.1* (Washington, D.C.: Federal Highway Administration, 1996) 48.

eliminating several important boundary rivers from the inventory since the NBI record relies on reporting from the states and the quality of the state reported data apparently varies greatly. However, enough bridges were able to be confirmed to provide a useful index of approximately 350 bridges from around the United States Since the NBI provides information on bridge ownership and maintenance responsibility, including the percentage responsibility shared with the neighboring state, it was possible to examine the ownership and maintenance of all of these bridges. One bridge that was not confirmed using the process was included because of its prominence and available literature indicating that it has an unusual agreement between the involved parties of its ownership and maintenance – the Woodrow Wilson Bridge over the Potomac River in the Washington, D.C. metropolitan region.

The availability of the NBI database allowed the type of owner and maintenance provider of each bridge to be identified, allowing a general overview of what types of organizations own and maintain inter-state river bridges across all 350 bridges. To examine some bridges in further detail, five bridges were examined in greater detailed selected by two main criteria – importance, measured by whether they are part of national signed road network, and simple availability of information about that specific bridge.

3.2.3.4 TEN-T Projects

In its most recent publication, the European Union Commission has identified thirty (30) priority transport corridors as part of the Trans-European Network it is charged with developing by the Maastricht treaty. These priority corridors include projects in the twenty-seven member Union of 2007 for a total involvement of a transport network involving twenty-seven countries. Each of these thirty corridors

has been broken down by the EU Commission into segments that allows the cross border portions of each corridor to be identified. Out of a total of 120 segments, 43 are identified cross-border segments. Once these cross border segments were identified, the responsible member-states and regions within member-states were identified and contacted either via their office in Brussels or online about responsibility for planning and construction of the cross border. This investigation revealed that many of these cross-border segments are only in the initial planning stages with limited information available either from the governments themselves or in the general literature. Therefore, attention was focused on segments that were either in construction or completed yielding a summary of the operations and organizational structures of the following segments:

1. The Channel Tunnel between Britain and France
2. The High Speed Rail line between Paris and Brussels
3. The High Speed Rail line between Brussels and Cologne
4. The High Speed Rail line between Brussels and Amsterdam
5. The Oresund Bridge between Denmark and Sweden

Availability of information from the Royal Belgian Library with its collection of planning literature from the Belgian authorities also had an influence on the decision to focus on the construction of the lines radiating from Brussels. Also, the railway network in northwestern Europe is the most complete international segment of the TEN-T. In particular, information on roadway projects was quite limited due only nine (9) projects having a roadway component with one completed rail/road project, one rail/road project in preliminary planning, one rail/road project consisting more a series of roadway improvements and ferry linkages rather than a discrete piece of infrastructure, and limited information in English and French available for the other

roadway projects. Out of the forty-three identified cross-border segments, only nine (9) are under construction or completed as of 2006. Therefore, the five segments examined represent most of the projects under construction or completed to date. Regarding the other three cross-border projects that could be considered, the new Brenner Tunnel only began construction in June, 2006, the Lyon-Turin LGV is subject to increasing political controversy resulting from public outcry over environmental issues within the Susa Valley in Italy creating a fluid environment, the Strasbourg – Bratislava line's construction consists mainly of work within Germany, and the Belfast-Dublin rail line had limited information available.

3.2.3 Analysis

In Chapter 5, generalized organizational arrangements for each of the specific examples are presented using the results of the investigations and summaries of the organizational structures for each type of projects developed in Chapter 4. These generalized types were then compared between the different areas to see if similar generalized organizational types existed for each area examined and at each level of governance. Additionally, practitioners in transportation policy and planning were interviewed asking them specifically about the generalized organizational types and whether they had encountered similar types of organizations in their fields. It was attempted to interview people involved at all levels of governance for a total of at least 10 interview subjects that represent a cross section of individuals involved in development of cross-boundary infrastructure or services from individuals working at public agencies to other stakeholders such as technical staff. The purpose of the interviews was to see whether the generalized organizational types were recognized by the persons involved in transportation planning and policy decisions as a reality

check on the applicability of the generalized types to existing practioners. Finally a short analysis comparison of the interview results with the generalized types examined.

3.2.4 Discussion

Chapter 6 discusses the implications of the analysis and ways that the results can be applied. Two examples are provided of how the results of the analysis could be applied – one an examination of potential lessons for the EU as it attempts to encourage the construction of a new river bridge between Bulgaria and Romania and the other an examination of lessons that could be applied to Atlanta as it struggles to develop regional transit services. The Atlanta region was selected primarily because it is the main region with which the author is most familiar. Additionally, since the dissertation opens with a discussion of Atlanta's past, discussing Atlanta's possible future is a way to unify the dissertation. The Danube bridge was selected as an identified TEN-T project that has not progressed as quickly as expected and is used to illustrate that the lessons of the U.S. experience between states can be transferred to a higher level of governance. Finally, some thoughts on directions further research based upon these results are provided.

CHAPTER 4

DESCRIPTION OF PROJECTS AT DIFFERENT LEVELS OF GOVERNANCE

This chapter describes each of the selected projects and services found in the four areas – Transit Services in U.S. metropolitan area, U.S. Commuter Rail services, U.S. bi-state river bridges, and cross-border segments of the EU Trans-European Transport Network. The first section covers U.S. metropolitan transit services examining Atlanta, Dallas, Denver, Houston, Miami, Phoenix and Seattle. The next section examines U.S. commuter rail systems covering the operations in Nashville, northern Virginia, Boston, northern Indiana, and Pennsylvania. The following section examines bi-state river bridges in the United States providing an overview of the results of the NBI followed by a follow-up of five bridges – the Woodrow Wilson Bridge, the U.S. 82 bridge over the Mississippi, the Benjamin Franklin Bridge, the Northampton Street Bridge, and the Bellevue, NE bridge over the Missouri river. The final section examines five of the cross-border segments of the TEN-T – the Channel Tunnel, the Belgian – French LGV, the Belgian – Netherlands LGV, the Belgian – German LGV, and the Oresund Bridge.

Section 4.1 – Types of Cross Boundary Organizations Found in Transit in U.S. Metropolitan Regions

Using the noted criteria – population > 1 million, increase in population > 500,000, 10-year growth rate > 15%, and contained within a single state – the following metropolitan areas were selected for closer examination of their regional

transit systems: Atlanta, Dallas, Denver, Houston, Miami, Phoenix, and Seattle. The results of these examinations are presented below.

Section 4.1.1 - Atlanta

According to the U.S. Census, the Atlanta metropolitan statistical area (MSA) has a population of 4,112,198 people in 2000 spread over twenty counties in northwestern Georgia. Transit service in the region is provided by four main agencies – the Metropolitan Atlanta Rapid Transit Authority (MARTA), Cobb Community Transit (CCT), Gwinnett County Transit (GCT), and the Georgia Regional Transportation Authority (GRTA) – and one small agency – City of Canton Transit. These agencies all provide fixed route bus services with MARTA also providing heavy rail services. These agencies are listed in Table 3.

Table 3 – Transit Providers in Atlanta as Reported by the NTD

Operator	Jurisdiction	Service Area Population	Services	NTD Agency Type
Metropolitan Rapid Transit Authority	Fulton and Dekalb counties	1,354,871	Local Bus, Heavy Rail	2. Independent Agency with an appointed Board of Directors
Georgia Regional Transportation Authority	Air Quality non-Attainment Area (Currently defined as 13-counties)	1,354,871	Bus	6. Unit of State Government
Gwinnett County Transit	Gwinnett County	542,468	Bus	5. Unit of County Government
Cobb Community Transit	Cobb County	277,226	Bus	5. Unit of County Government
City of Canton Transit	City of Canton	11,500	Bus	4. Unit of City or Municipal Government

Service areas are primarily defined by county boundaries with MARTA providing service to two counties, CCT and GCT providing service to one county each, and GRTA providing local service in one additional county and express bus

service in another eleven counties. GRTA's local service is operated only in Clayton County under a different brand name, C-TRANS. GRTA's express service is run throughout the region under the brand "Xpress" and is primarily a commuter operation with buses only in peak hours, though some routes operate throughout the day. Additionally, Xpress services that operate within the Cobb and Gwinnett counties, the service areas of CCT and GCT respectively, operate under the CCT or GCT brand and fare structures. The City of Canton, located in Cherokee County north of Cobb County, operates a small fixed route loop service entirely within the City limits and also contracts with CCT for express bus service from Canton to Atlanta. The Canton express bus service is operated under CCT livery and fares, though funding is provided by the City of Canton. Interchanges between the MARTA and the other systems occur at eight specific locations –

Five Points Station (Xpress, CCT, and GCT)

Airport Station (CTRANS)

H.E. Holmes Station (CCT)

Civic Center Station (Xpress, CCT, and GCT)

Arts Center Station (CCT and GCT)

Lindbergh Center Station (GCT)

Dunwoody Station (CCT)

Doraville Station (GCT and Xpress)

Each system has a different fare structure. While GRTA is a state agency with its jurisdiction dictated by air-quality measures and has the powers to operate transit services within its jurisdiction, it currently operates only with eleven (11) of the thirteen (13) counties that make up its jurisdiction. Since it operates what are two separate systems, GRTA has the most interesting fare structure with CTRANs, the

local service operating independently of the express commuter services. Within the commuter service, if the commuter service originates with the service area of CCT or GCT, then that service is operated by CCT or GCT jointly with GRTA. While transfers between MARTA and each of the others systems is free in a one-way direction, meaning that a traveler may board one system and transfer to another system for free. These transfer agreements are conducted on a case-by-case basis between MARTA and the system in question. There are no transfer agreements between any of the other systems meaning that a passenger traveling on GCT to CCT must pay the fare for both systems, though there are only limited places in the region where this interchange can occur.

The conclusion is that regional transit operation in Atlanta is achieved through bi-lateral intergovernmental agreement with the following types of agreements:

MARTA – CCT = Type D – Type E agreement

MARTA – GCT = Type D – Type E agreement

MARTA – GRTA (Local service) = Type D – Type C agreement

MARTA – GRTA (Express Service) = Type D – Type C agreement

CCT – City of Canton = Type E – Type F agreement

Section 4.1.2 - Dallas

According to the U.S. Census, the Dallas / Fort Worth consolidated metropolitan statistical area (CMSA) had a population of 5,221,801 spread over two MSAs – Dallas and Fort Worth – Arlington – comprising twelve counties in North Central Texas. Transit service in the region is provided by three agencies – Dallas Area Rapid Transit (DART), the Fort Worth Transportation Authority (The T), and the City of Denton (the LINK). These agencies all provide fixed route bus services

with DART also providing light rail service on two lines and DART and The T jointly providing commuter rail service on one line between downtown Fort Worth and downtown Dallas. These agencies are listed in Table 4.

Table 4 – Transit Providers in Dallas as Reported by the NTD

Operator	**Jurisdiction**	**Service Area Population**	**Services**	**NTD Agency Type**
Fort Worth Transportation Authority	Tarrant County	609,450	Bus, Commuter Rail	2. Independent Agency with an Appointment Board of Directors
City of Denton Public Transportation Department	City of Denton	92,000	Bus	4. Unit of City or Municipal Government
Dallas Area Rapid Transit	Cities of Irving, Carrollton, Farmers Branch, Addison, Plano, Richardson, Garland, Rowlett, University Park, Highland Park, Dallas, Cockrell Hill, and Glenn Heights	2,224,300	Bus, Commuter Rail, Light Rail	2. Independent Agency with an Appointed Board of Directors

Service areas are defined by political boundaries with DART providing service to twelve cities, The T providing service to one county, and the LINK providing local service in one additional area. Further investigation of the LINK service indicated that as of 2005, all the assets and operations of service provided by the LINK had been purchased and taken over by the Denton County Transportation Authority (DCTA). This Authority can operate within Denton County and provide service in areas that vote for financial support of a sales take – currently limited to the cities of Denton, Lewiston, and Highland Village. The stated goal of the new authority is to provide rail service to connect with the DART light rail system in

addition to operating local bus service within Denton County.[56] On May 30, 2006, DCTA began operating express bus service between Denton and Lewisville to Downtown Dallas, including a reverse commute service representing the first direct links between DCTA (or its predecessors) and DART.[57] There is not indication of a fare sharing agreement in place between DCTA and DART, though there is potential for them sharing the same service area since Carrollton, a member of DART, is also located within Denton County and eligible for membership in DCTA as well.

The Trinity Rail Express (TRE), as the commuter rail operation is called, is operated jointly by DART and the T jointly through a cooperative service agreement and provides service between Downtown Ft. Worth and Downtown Dallas.[58] TRE began service in 1996 and until 2000, operated exclusively in Dallas County before being extended into Tarrant County.[59] NTD data shows that the T did not begin providing financial support for operating the service until 2000 when service was extended to Tarrant County. There are no direct bus links between DART and the T, though DART does sell tickets that are valid on for all travel on DART, Trinity Rail Express, and the T.[60]

Therefore regional transit services are provided both through cooperative agreements between cities – DCTA and DART, and also bi-lateral agreements between operators – TRE service between DART and the T.

DART and DCTA – Type D organization that is a product of agreement between Type F organizations

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[56] *Financial Statements and Supplementary Information Fiscal Years Ended September 20, 2005 and 2004*, (Lewisville, TX: Denton County Transportation Authority, 2005) 2.
[57] *DCTA Briefing May 2006* (Lewisville, TX: Denton County Transportation Authority, 2006)
[58] *Trinity Railway Express (TRE) – TRE Business* (Dallas: Trinity Railway Express, 2006) http://www.trinityrailwayexpress.org/tre-meetings.html (Last Accessed: August 21, 2006)
[59] *Trinity Railway Express Facts* (Dallas: Trinity Railway Express, 2006) http://www.trinityrailwayexpress.org/traininfo.html (Last Accessed: August 21, 2006)
[60] *Riding DART – DART Fares* (Dallas: Dallas Area Rapid Transit, 2006) http://www.dart.org/riding.asp?zeon=DARTFares (Last Accessed: August 21, 2006)

Trinity Rail Express – Bi-lateral agreement between a Type D organization – DART – and a Type E organization – the T.

Section 4.1.3 - Denver

According to the U.S. Census, the Denver MSA had a population of 2,581,506 people spread over five counties in central Colorado. Transit service in the region is provided by two agencies – the Denver Regional Transportation District (RTD) and the City of Greeley (the Bus). These agencies are listed in Table 5.

Table 5 – Transit Providers in Denver as Reported by the NTD

Operator	Jurisdiction	Service Area Population	Services	NTD Agency Type
Denver Regional Transportation District	Denver, Broomfield, Boulder, and Jefferson counties, western Adams and Arapahoe counties, NE Douglas County and Weld County located within Longmont and Erie	2,545,000	Bus, Light Rail	6. Unit of State Government
City of Greeley	City of Greeley	93,000	Bus	4. Unit of City or Municipal Government

These agencies all provide fixed route bus services with RTD also providing light rail services. Service areas are defined by urbanized areas boundaries with RTD providing service to the urbanized portions of seven counties – Denver, Boulder, Arapahoe, Adams, Broomfield, Weld, Douglas, and Jefferson – and the Bus providing local service in the City of Greeley on six routes. RTD was formed in 1969 by the State of Colorado whose board is directly elected by the public.[61] It operates a variety

[61] *2006 Adopted Budget* (Denver: Regional Transportation District, 2005) 12.

of services including local bus services, limited local service, express services designed to serve commuter, and regional bus services that sometimes are scheduled throughout the day to link the various cities in the service area such as between Boulder and Denver and Boulder and Longmont. The city of Greeley service is operated as a unit of the municipal government and provides limited local fixed-route service.

While RTD has constructed and been the primary leader with construction of its existing light-rail system, with the new South-east line under construction, RTD partnered extensively with the State Department of Transportation in a project known as T-REX. This project includes a major widening of I-25 and I-225 as well construction of a 19-mile light-rail line along the corridor. The project is governed by an intergovernmental agreement between RTD and Colorado DOT.

Section 4.1.4 - Houston

According to the U.S. Census, the Houston MSA had a population of 4,669,571 people spread over eight counties in southeastern Texas. Transit service in the region is provided by two agencies – the Metropolitan Transit Authority of Harris County (Metro) and Island Transit. Both of these agencies provide fixed route bus and light rail services. Service areas are defined by political boundaries with Metro providing services within Harris County and Island Transit serving the City of Galveston. These agencies are listed in Table 6.

Table 6 – Transit Providers in Houston as Reported by the NTD

Operator	Jurisdiction	Service Area Population	Services	NTD Agency Type
Island Transit	City of Galveston	57,247	Bus, Light Rail	4. Unit of City or Municipal Government
Metropolitan Transit Authority of Harris County (Metro)	Harris County	2,796,994	Bus, Light Rail	2. Independent Agency with an appointed Board of Directors

There are no direct links between Metro and Island Transit meaning that there are no links across political boundaries within metropolitan Houston. Governmental cooperation in Houston has instead focused more on Metro's interactions with other agencies operating within Harris County. Metro provides a wide variety of services and has been a at the forefront of the development of managed lanes, cooperating with the Texas DOT (TxDOT) and Harris County Toll Road Authority (HCTRA) in the development of a 100+ mile network of reversible High-Occupancy Vehicle (HOV) lanes that are used by Metro's buses. Metro, established in 1978 by a county-wide vote, grew out of the city run Office of Public Transportation which had taken over the private bus system in 1974 after voters defeated a plan to create the Houston Area Rapid Transit Authority.[62] While Metro is limited to servicing Harris County, to build its transit infrastructure throughout the county, it has partnered with the TxDOT and HCTRA to construct the HOV network. One specific example of how this cooperation works is with the expansion of the Katy Freeway east of downtown. Here, a freeway was being expanded from six general purpose lanes and one-HOV lane to eight general purpose lanes and four managed lanes. Two Memorandums of

[62] Katherine F. Turnbull, *Houston Managed Lanes Case Study: The Evolution of the Houston HOV System,* (Washington, D.C.: Operations Office of Transportation Management, Federal Highway Administration, September 2003) 7.

Understandings was worked out in agreement between Metro, TxDOT, and HCTRA specifying transit access points, funding, and responsibilities for maintenance and construction.[63]

Section 4.1.5 - Miami

According to the U.S. Census, the Miami / Fort Lauderdale CMSA had a population of 3,876,380 people spread over two MSAs – Miami and Fort Lauderdale – comprising two counties in southeastern Florida. Transit service in the region is provided by four agencies – Miami-Dade Transit (MDT), Broward County Mass Transit Division, Hialeah Transit, and the South Florida Regional Transportation Authority (SFTRA or Tri-Rail). These agencies are listed in Table 7.

Table 7 – Transit Providers in Miami as Reported by the NTD

Operator	Jurisdiction	Service Area Population	Services	NTD Agency Type
South Florida Regional Transportation Authority (TRI-Rail)	Broward, Dade, and Palm Beach counties	4,919,036	Bus, Commuter Rail	2. Independent Agency with an appointed Board of Directors
Miami - Dade Transit (MDT)	Miami-Dade County	2,345,932	Bus, Heavy Rail, Automated Guideway	5. Unit of County Government
Broward County Mass Transit Division	Broward County	1,623,018	Bus, Ferryboat	5. Unit of County Government

These agencies all provide fixed route bus services with MTD also providing heavy rail services and Tri-Rail providing primarily commuter rail service on one line between Miami International Airport and central Palm Beach County. Service areas are defined by political boundaries with MTD and Broward Transit each providing

[63] Turnbull, 24-25.

service within their respective counties and Tri-Rail authorized to provide service in three counties. MTD operates four routes that cross over into Broward County – 175 NW Dade Express, V, 3, and K. Transfers are $0.15 to Broward County services with an MTD bus transfer. Hialeah Transit operates one bus route within the city limits of Hialeah and operates a common transfer and fare policy with MTD with both organizations accepting transfers and passes issued by the other organization. This arrangement with Hialeah Transit is covered by an inter-local agreement between the City of Hialeah and Miami-Dade.For transfers to Tri-Rail, the Metrobus Transfer provides for a discount off the Tri-Rail fare with Tri-Rail tickets and passes accepted onto the MTD system, with the exception of express buses. [64]

Therefore, transit is provided in the Miami region by one type F organization – Hialeah Transit, two type E organizations – MTD and Broward County, and one type D organization – SFRTA which is made up of type E governments. Travel between systems is governed by bi-lateral intergovernmental agreements.

Section 4.1.6 - Phoenix

According to the U.S. Census, the Phoenix MSA had a population of 3,251,876 people living in two counties in southwestern Arizona. Transit service in the region is provided by several transit providers including the cities of Mesa, Glendale, Tempe, Chandler, and Phoenix. These agencies are listed in Table 8.

[64] *Transfers* (Miami: Miami-Dade County – Transit, 2006) http://www.miamidade.gov/transit/transferother.asp#Broward%20county%20transit (Last Accessed: August 21, 2006)

Table 8 – Transit Providers in Phoenix as Reported by the NTD

Operator	Jurisdiction	Service Area Population	Services	NTD Agency Type
Valley Metro (Regional Public Transportation Authority)	Cities of Avondale, Chandler, El Mirage, Fountain Hills, Gilbert, Glendale, Goodyear, Guadalupe, Litchfield Park, Mesa, Paradise Valley, Peoria, Phoenix, Queen Creek, Scottsdale, Sun City, Surprise, Tempe, Tolleson, and Maricopa County	2,061,020	Bus, 2004	1. Independent Agency with an elected Board of Directors
City of Tempe Transportation Planning and Transit	City of Tempe	158,625	Bus, Light Rail	4. Unit of City or Municipal Government
City of Glendale Transit	City of Glendale	225,000	Bus	4. Unit of City or Municipal Government
City of Mesa	City of Mesa	425,000	Bus	4. Unit of City or Municipal Government
City of Phoenix Public Transit Department	City of Phoenix	1,417,052	Bus, Light Rail	4. Unit of City or Municipal Government

Transit operations in Phoenix are somewhat complicated despite all transit services being contained entirely within Maricopa County. In 2006, only bus-based service is operational including express and local routes, though a light-rail line is under construction between Phoenix and Tempe. The main operator of local and express bus services is the Regional Public Transportation Authority, more commonly referred to as Valley Metro. Valley Metro's membership consists of cities within Maricopa County that agree to provide a dedicated source of funding for transit. Some member cities contract with Valley Metro to provide operating support for their bus service and other contract with Valley Metro to provide some of their services directly while maintaining other services under their control. However, all public

transit in the region operates under the Valley Metro brand and name, even if operated directly by the city itself such as Route 1 – Washington in Phoenix. Even more complicated is the arrangement for the construction of the light rail line from Phoenix to Mesa through Glendale and Tempe. The city councils of each municipality agreed to form a public, non-profit corporation called Valley Metro Rail that is responsible for planning, designing, constructing, and operating the light rail line. Valley Metro Rail is a separate entity from Valley Metro, though Valley Metro Rail in turn contracts with Valley Metro to provide personnel operations, administrative support and even has Valley Metro hire its staff. However, Valley Metro is not liable or responsible for Valley Metro Rail as Valley Metro Rail reports to its separate and independent board consisting of the four municipalities that created it. One final feature is that even though Valley Metro Rail and Valley Metro are independent, they are still related and Valley Metro Rail is under Valley Metro since each of the four cities to which Valley Metro Rail reports to are members of Valley Metro itself.[65]

In spite of the complex relationships between the transit operators, the underlying organization of both Valley Metro and Valley Metro Rail, the two services which provide cross-boundary travel within Phoenix, is the same. Both organizations are the creation of a group of Level F organizations, in this case the cities that lie within Maricopa County.

Section 4.1.7 - Seattle

According to the U.S. Census, Seattle-Tacoma-Bremerton CMSA had a population of 3,553,760 people spread over four MSA – Bremerton, Olympia, Seattle-Bellevue-Everett, and Tacoma – comprising six counties in northwestern Washington.

[65] *Comprehensive Annual Financial Report: Fiscal Year Ended June 30, 2005*. (Phoenix; Valley Metro Regional Public Transportation Authority, 2005) 28.

Transit service in the region is provided by ten agencies – Washington State Ferries, the Seattle Center Monorail Transit, Pierce County Transportation Benefit Area Authority, King County Metro, Everett Transit, Central Puget Sound Regional Transit Authority (Sound Transit), Snohomish County Transportation Benefit Area Corporation (Community Transit), Thurston County Public Transportation Benefit Area (Intercity Transit), Kitsap Transit and Pierce County Ferry. These agencies are listed in Table 9.

Table 9 – Transit Providers in Seattle as Reported by the NTD

Operator	**Jurisdiction**	**Service Area Population**	**Services**	**NTD Agency Type**
Washington State Ferries		2,712,205	Ferryboat	6. Unit of State Government
Seattle Center Monorail Transit	City of Seattle	495,500	Monorail	4. Unit of City or Municipal Government
Kitsap Transit	Kitsap County	237,000	Bus, Ferryboat	1. Independent Agency with an elected Board of Directors
Pierce County Transportation Benefit Area Authority	Pierce County	702,060	Bus	2. Independent Agency with an appointed Board of Directors
King County Metro	King County	1,768,300	Bus, Light Rail, Trolley Bus	5. Unit of County Government
Everett Transit	City of Everett	96,840	Bus	4. Unit of City or Municipal Government
Pierce County Ferry	Pierce County	725,000	Ferryboat	5. Unit of County Government
Sound Transit	Urbanized areas of King, Pierce and Snohomish counties	2,712,205	Bus, Commuter Rail, Light Rail, Trolley Bus	2. Independent Agency with an appointed Board of Directors
Snohomish County Transportation Benefit Area Corporation (Community Transit)	Snohomish County	700,682	Bus	2. Independent Agency with an appointed Board of Directors
Intercity Transit	Olympia - Lacey	136,648	Bus	2. Independent Agency with an appointed Board of Directors

Sound Transit provides fixed route bus, commuter rail, and light rail services and was created in 1993 for the express purpose of developing and operating a regional high-capacity transit system.[66] Some of the main features of the agreement for Sound Transit are that it operates within the urbanized areas of King, Pierce, and Snohomish counties, which have been subdivided into five sub-areas, and that all funds must be distributed within the sub-area they were collected in and that work must occur simultaneously in all sub-areas. King County Metro operates bus, trolley bus and light rail services. The Seattle Center Monorail operates a short monorail service and is a division of the City of Seattle. Washington State Ferries and Pierce County Ferries exclusively operate ferry services within Puget Sound. Kitsap Transit is primarily a local bus operator that provides a small pedestrian only ferry operation linking Bremerton and Port Orchard.[67] The other operators provide fix route bus services. Pierce Transit operates in Pierce County south of King County with three routes that operated into King County – 500 – Federal Way, 501- Milton – Federal Way, and 402 – Meridian. Each of these routes travels for a short distance within King Count to Sound Transit constructed Federal Way Transit Center.[68] There are regional bus services provided in Pierce County, but these routes are operated by Sound Transit. Community Transit, which serves Snohomish County, provides local and express services within the cities on Snohomish County that have voted to join Community Transit, which is all cities except for the City of Everett which operates its own local bus service.[69] Community Transit operates a number of express commuter routes into King County primarily to downtown Seattle. Everett Transit is

[66] *Sound Transit's History* (Seattle; Sound Transit, 2006). http://www.soundtransit.org/x1228.xml (Last Accessed August 17, 2006).
[67] *South Kitsap System Map* (Bremerton, WA; Kitsap Transit, 2006).
[68] *Pierce County System Map* (Tacoma, WA: Pierce County Transit, 2006).
[69] *Community Transit's Rich History* (Everett, WA: Community Transit, 2006) http://www.commtrans.org/?mc=commtrans&subcat=2# (Last accessed: August 24, 2006)

a division of the City of Everett and operates local bus services within Everett. These seven main agencies – Kitsap Transit, Washington State Ferries, Sound Transit, Everett Transit, Community Transit, Pierce Transit, and King County Metro – have reached an agreement for a unified fare system throughout the region called "Puget Pass." This pass is a unified pass that allows the public to travel on any of the participating systems and is governed by a multi-agency intergovernmental agreement.[70]

Intercity Transit, officially the Thurston County Public Transportation Benefit Area, currently serves the urbanized areas of Olympia, Lacey, Tumwater, and Yelm in Thurston County, though it used to serve the entire area of Thurston County until a significant source of tax revenue was lost in 1999.[71] Additionally, to connect to the rest of the Puget Sound region, Intercity Transit jointly operates a five-route service, name and branded as *Olympia Express*, with Pierce Transit linking their respective service areas with Intercity Transit operating three of the five routes and Pierce Transit the other routes.[72]

The large number of transit operations in Seattle is reminiscent of Atlanta with several agencies operating with the same region. Upon examination it became clear the transit is provided by each service within its jurisdiction with transit that crosses county service boundaries such as commuter rail and buses is provided primarily by Sound Transit which is a federal-type agreement between the various municipalities in three counties involved, so Sound Transit functions like a Type D entity made up of

[70] Christ Cluett et al, *Evaluation of the Central Puget Sound Regional Fare Coordination Project* (Washington, D.C.; Federal Highway Administration, HOTO, April 13, 2006) 39.
[71] *2006 Annual Report & 2006-2011 Transit Development Plan* (Olympia, WA: Intercity Transit, 2006) 1.
[72] *2006 Annual Report & 2006-2011 Transit Development Plan*, 5.

Type E entities.[73] Other interjurisdictional services are operated either to a Sound Transit facility, such as Pierce Transit's local routes, as independent express bus services like Community Transit's routes to King County, or through inter-governmental agreements between two counties defined Transportation Benefit Areas such as the five routes between Thurston and Pierce counties.

Having described the regional transit operations in the selected U.S. metropolitan areas, the next section continues with a description of selected U.S. commuter rail systems.

Section 4.2 – U.S. Commuter Rail Systems

In 2006, there were nineteen (19) commuter rail systems operating in the United States, including two that started. Table 10 lists these systems, their location, whether they are a legacy system and their NTD Agency Type.

[73] Jill Strube, "Fragmentation and Mass Transit: Struggling to get Connected" in *Research in Urban Policy. Vol. 7* editors Fred W. Becker and Milan J. Dluhy, (Stamford, CT: JAI Press,1998) 247.

Table 10 – Commuter Rail Agencies in the U.S. in 2006

Agency	City	State	2002 Dir Route Miles	Post 1980 Start-up?	NTD Agency Type
Central Puget Sound Regional	Seattle	WA	107.50	Y	2. Independent Agency with an appointed Board of Directors
Massachusetts Bay Transportation	Boston	MA	584.00	N	2. Independent Agency with an appointed Board of Directors
Connecticut Department of	Newington	CT	103.00	Y	6. Unit of State Government
Metro-North Commuter Railroad	New York	NY	799.60	N	3. Subsidiary Operating Unit of Regional Agency
New Jersey Transit Corporation	Newark	NJ	1,121.00	N	2. Independent Agency with an appointed Board of Directors
Long Island Rail Road Company	Jamaica	NY	701.10	N	2. Independent Agency with an appointed Board of Directors
Southeastern Pennsylvania	Philadelphia	PA	695.00	N	2. Independent Agency with an appointed Board of Directors
Mass Transit Administration,	Baltimore	MD	471.00	N	6. Unit of State Government
Virginia Railway Express	Alexandria	VA	190.00	Y	2. Independent Agency with an appointed Board of Directors
Tri-County Commuter Rail Authority	Fort Lauderdale	FL	104.00	Y	2. Independent Agency with an appointed Board of Directors
Northern Indiana Commuter	Chesterton	IN	130.40	N	2. Independent Agency with an appointed Board of Directors
Northeast Illinois Regional Railroad	Chicago	IL	1,144.00	N	2. Independent Agency with an appointed Board of Directors
Dallas Area Rapid Transit Authority	Dallas	TX	20.70	Y	2. Independent Agency with an appointed Board of Directors
North San Diego County Transit	Oceanside	CA	82.00	Y	2. Independent Agency with an appointed Board of Directors
Peninsula Corridor	San Carlos	CA	130.00	N	2. Independent Agency with an appointed Board of Directors
Southern California Regional Rail	Los Angeles	CA	623.00	Y	2. Independent Agency with an appointed Board of Directors
Altamont Commuter Express	Stockton	CA	180.00	Y	2. Independent Agency with an appointed Board of Directors
Regional Transportation Authority*	Nashville	TN	N/A	Y	N/A
New Mexico Department of Transportation*	Albuquerque	NM	N/A	Y	N/A

*Sources other than NTD

Fourteen of the existing agencies operate as an independent agency, with two operating as a part of the state, and one operating as a division of a regional agency. Of the two new operations, the Regional Transportation Authority in Nashville is another independent agency while the New Mexico Rail Runner in Albuquerque is operated by the state department of transportation. To provide a little more insight into whether these independent agencies operating the commuter rail services were similar, six (6) were examined in more detailed, three pre-1980 commuter rail legacy systems and three post-1980 start-ups. 1980 was selected as a cut-off year since the 1970s and '80s were years of transition between privately operated commuter rail systems and publicly operated systems. For instance, in 1976, the *Transit Fact Book* of the American Public Transit Association lists eleven cities with commuter rail services of which only one is a public owned operation – the Staten Island Rapid Transit Operating Authority, while the *1990 Transit Fact Book* lists operations in twelve cities of which all are publicly owned.[74],[75] The six systems described below are the Music City Express in Nashville, the Virginia Rail Express in Northern Virginia, Tri-Rail in southeastern Florida, the Massachusetts Bay Transportation Authority in Boston, the Northern Indian Commuter Rail District in northwestern Indiana, and the Southeastern Pennsylvania Transportation Authority in Philadelphia.

Section 4.2.1 - Nashville

The Music City Star, as the commuter rail line in Nashville is known, is a 32-mile line running from downtown Nashville to Lebanon, TN. Construction of the line began in 2004 and the line opened to passengers on September 18, 2006. The system is run by Regional Transportation Authority (RTA) created in 1988 to provide by the

[74] *Transit Fact Book 1976-1977 Edition* (Washington, D.C.: American Public Transit Association, 1977) 46.
[75] *1990 Transit Fact Book* (Washington, D.C.: American Public Transit Association, 1990) 47.

state legislature and encompasses a nine-county region in Middle Tennessee surrounding Nashville. While the MTA has been the lead agency implementing the Music City Star, its primary activities have been to provide car-sharing, ride matching, van-pools, and commuter express buses in the Nashville Region.[76] Local bus service in Nashville is run by the Metropolitan Transit Authority (MTA). This line is the first of five high-capacity transit corridors identified by RTA for implementation. The East Corridor to Lebanon was selected as the first line to be constructed because the right-of-way was publicly owned by the Nashville & Eastern Railroad Corporation and 45% of commuters of Wilson County, where Lebanon is located, commute to work into Nashville/Davidson County.[77] Recognizing that the nature of the RTA is changing, it has formed a task force to review the structure of the RTA to be completed once service has started on the commuter rail line. Members of the reorganization task force is interesting and includes representatives from four of the nine counties, three representatives municipal governments including Nashville, and two state level representatives.[78]

Section 4.2.2 - Virginia Railway Express

The Virginia Railway Express (VRE) operates peak hour service on two lines between Northern Virginia and Washington, D.C. The tracks on the Manassas Line are owned and dispatched by Norfolk Southern Railway, while tracks on the Fredericksburg line and the joint line into Washington, D.C. are owned and dispatched by CSX Transportation. The VRE was created in 1989 as a joint venture

[76] *$6 Million for Music City Star Part of Final Transportation Funding Conference Report* (Press release) (Nashville; Regional Transportation Authority, November 18, 2005)
[77] Teresa McKissick, "Nashville's Music City Start on Track to Open this Year," in *Passenger Transport* (Washington, D.C.; American Public Transit Association, January 30, 2006) 16 – 17.
[78] *Music City State East Corridor Commuter Rail Service Business Plan*, (Nashville; East Corridor Oversight Committee, Regional Transportation Authority, August 17, 2005) 11.

between the Northern Virginia Transportation Commission and the Potomac and Rappahannock Transportation Commissions, the two designed MPOs in northern Virginia, and began service in 1992. Currently, VRE operates 90 route-miles in the District of Columbia and Arlington, Fairfax, Prince William, and Stafford counties in Virginia. The arrangement between the two commissions is governed by a Master's Agreement which states the VRE is controlled by an Operations Board which consists of three members from each commission plus one representative from the Virginia Department of Rail and Public Transportation, for a seven member board. Funding for the VRE comes from multiple sources including fares, Commuter Rail Revenue Bonds, state and federal grants, as well as jurisdictional contributions governed by a by a population/ridership formula and voluntary contributions from Arlington County and the City of Alexandria, VA. [79]Therefore, VRE is a type D organization set up in agreement between two other type D organizations with voluntary contributions from Type E and F organizations.

Section 4.2.3 - South Florida Regional Transportation Authority

Tri-Rail, officially the South Florida Regional Transportation Authority, operates one commuter rail in south-east Florida covering Miami-Dade, Broward and Palm Beach counties as well as a feeder bus system serving the single line. The line was started in 1989 as part of commuter relief for construction work on the parallel interstate route I-95, and was the first successful start up of a commuter rail system in the United States since WWII. The governing board contains members from each county served including citizen members, elected county officials, and governor appointees. The Authority has also had a variety of names throughout its short life

[79] *Virginia Railway Express Financial Statements for the Years Ended June 30, 2005 and 2004*. (Harrisonburg, VA; Virginia Railway Express, 2005) 18.

including the Tri-County Commuter Rail Authority and Tri-County Rail Organization and is established under direct charter by the state of Florida.[80] The statute governing SFRTA defines its service boundaries by counties and provides for representation on the governing board for each county – one elected county commissioner and one citizen appointee. Additionally, while the statute makes it explicitly clear that SFTRA is to be the coordinating regional agency for public transit within its service area, it may not operate duplicate service without the consent of an existing service provider, such as Broward Transit or MTD.[81] SFRTA is therefore a type D organization set up by the state with its membership and jurisdiction defined by the counties that agree to participate in it.

Section 4.2.4 - Massachusetts Bay Transportation Authority

The Massachusetts Bay Transportation Authority (MBTA) officially came into existence in 1964 and took over responsibility for the Metropolitan Transit Authority (MTA)'s rapid transit and bus service lines in central Boston and also bus and rail service throughout the eastern portion of Massachusetts and is a political subdivision of the Commonwealth. The MBTA today operates all bus, light rail, heavy rail, commuter rail and commuter boat services within Eastern Massachusetts, including thirteen (13) commuter rail lines. Commuter rail services north of Boston were privately operated originally by the Boston & Maine Railroad Corporation with information from the American Public Transit Association indicating that the MBTA officially took over operations of commuter rail services in 1977, though the Boston and Maine continued to operate the trains under contract.[82] While all of the commuter

[80] *Chapter 2003-159 Laws of Florida* (Tallahassee, FL; Legislature of Florida, 2003) 1.
[81] *Chapter 2003-159 Laws of Florida,* 4.
[82] *Transit Fact Book 1977-1978 Edition* (Washington, D.C.; American Public Transit Association, 1978) 59.

rail service operates stops within Massachusetts and has one terminus in one of the downtown Boston Stations (either North Station or South Station), the Attleboro/Providence line also serves Providence, RI, and will be extended to Wickford, RI in 2009. This service is governed by a bi-state agreement between the State of Rhode Island and the Commonwealth of Massachusetts with the original agreement between Rhode Island and Massachusetts provided for weekday service between Providence and Boston starting in 1988 and which was renewed for ten years with additional service in 1995. The contract was recently extended through 2009 and includes weekend service and an extension of some trains to Wickford, RI.[83] MBTA service in fact represents two types of agreements. First, the MBTA is itself a Type C organization since it is officially a state organization that the state created to provide service within a defined area of eastern Massachusetts defined by the municipalities that make up metropolitan Boston. All commuter rail service within Massachusetts is thus provided by a Type C entity. However, the service to Providence is governed by an intergovernmental agreement between two Type C entities – the MBTA and the State of Rhode Island with the commuter rail service operating under MBTA control and identity even though it is funded by Rhode Island.

Section 4.2.5 - Southeastern Pennsylvania Transportation Authority

The Southeastern Pennsylvania Transportation Authority (SEPTA) came about in 1964 and operates bus, lightrail, heavy-rail, and commuter rail services within a four-county area surrounding the city of Philadelphia. At the time the Authority formed, commuter rail services were by the private companies, with the Reading and Pennsylvania railroads operating the suburban lines with no interchange

[83] "South County Commuter Rail," *Rhode Island Statewide Planning Program*. Presentation: April 1, 2005.

between the services. SEPTA became the official provider of these services, but in reality, SEPTA purchased services from the two historic owners who continued to dispatch and run the trains with their own crews. Between 1976 and 1979, SEPTA became of the owner of the rails over which it suburban services ran and in 1984, began operating the services under its own crew. The American Public Transit Association indicates that SEPTA began contracting with the Consolidated Rail Corporation, the successor to Pennsylvania Railroad, in 1977.[84] Today, SEPTA is a publicly owned operator providing commuter rail services on seven (7) routes over rail lines it primarily owns, with the exception of the Paoli line, which is owned by AMTRAK.

Section 4.2.6 - Northern Indiana Commuter Transportation District

The Northern Indiana Commuter Transportation District (NICTD) operates a single 88-mile line between South Bend in northern Indiana and Chicago. Tracks are shared with Metra within Illinois and operating costs of that section are shared with Metra, though passengers are not allowed to board NICTD trains towards Chicago within Illinois.[85],[86] NICTD is a publicly owned and operated successor to previously privately operated service, the Chicago South Shore and South Bend Railroad. NICTD was formed in 1977 by the State of Indiana to contract out operation of the inter-urban service and started operating trains directly in December, 1989, purchasing outright the tracks one year later in 1990.[87] NICTD is governed by an eleven member board with three governor appointees and two members from each of

[84] *Transit Fact Book 1977-1978 Edition*, 56.
[85] L. David Shen and Jeffery G. Mora, "The Resurgence of Commuter Rail," in *ITE Journal*, 64, no. 3, (Washington, D.C.: ITE Press, 1994)
[86] *Daily Westbound to Chicago Schedule*, (Chesterton, IN; Northern Indiana Commuter Transportation District, 2006) http://www.nictd.com/service/dailywestbound.htm (Last Accessed July 10, 2006).
[87] *History of NICTD*, (Chesterton, IN; Northern Indiana Commuter Transportation District, 2006) http://www.nictd.com/links/ourhistory.htm (Last Accessed July 10, 2006).

the four counties through which the railroad runs.[88] While the NICTD was created by the state, it functions more as a Type D entity serving the four counties within which it operates. Service into Chicago is governed by a contract with Metra (Northeast Illinois Commuter Railroad Corporation) setting up the operation windows and travel time components for NICTD trains while they are in Illinois.[89] Interstate service between Indiana and Illinois is therefore governed by a bi-lateral agreement between two type D organizations with internal Indiana service operating as a separate entity with each county represented on NICTD governing board.

Section 4.3 – Examination of U.S. Cross Boundary River Bridges

Obtaining a single list of U.S. bi-state river bridges required significant effort. Using Google Earth, the National Bridge Inventory, and other sources it was possible to conclusively identify the owners and maintenance responsibility of three hundred and fifty-six (356) cross border river bridges in the United States. This represents over 70% of all identified bridges and includes nearly all bridges along the following rivers:

Columbia (Oregon and Washington)

Mississippi (Louisiana, Mississippi, Tennessee, Arkansas, Kentucky, Illinois, Missouri, Iowa, Minnesota and Wisconsin)

Red River of the North (Minnesota and Wisconsin)

Red River (Texas and Oklahoma)

Sabine River (Texas and Louisiana)

Snake River (Washington and Idaho)

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[88] *Board of Trustees* (Chesterton, IN; Northern Indiana Commuter Transportation District, 2006) http://www.nictd.com/info/corporate/board.htm (Last Accessed August 29, 2006)
[89] *Northern Indiana Commuter Transportation District Board Meeting September 30, 2005* (Chesterton, IN; Northern Indiana Commuter Transportation District, 2005) 3.

Missouri River (Missouri, Kansas, Iowa, and Nebraska)

Big Sioux River (South Dakota, Iowa, and Nebraska)

Delaware (Pennsylvania, New Jersey and New York)

As well as other some bridges along the following rivers:

Connecticut (New Hampshire and Vermont)

Hudson (New York and New Jersey)

Ohio (West Virginia, Ohio, Kentucky, Indiana, and Illinois)

Savannah (Georgia and South Carolina)

Chattahoochee (Georgia and Alabama)

Perdido (Florida and Alabama)

Big Tug Creek (Kentucky and West Virginia)

Potomac (West Virginia, Maryland, Virginia, and the District of Columbia)

Wabash (Indiana and Illinois)

Menominee (Wisconsin and Michigan)

Colorado (Arizona, Nevada, and California)

Table 11 provides the breakdown of the bridge ownership and maintenance. Figure 1 provides a chart of bridge ownership. Figure 2 provides a chart of bridge maintenance responsibility

Table 11 - Available Bridge Ownership and Maintenance Responsibility

Agency Type	**Bridges Owned**	**Bridges Maintained**
State Highway Agency	241	239
Local Government	49	49
Toll Authority	38	40
Other	28	28
Total	356	356

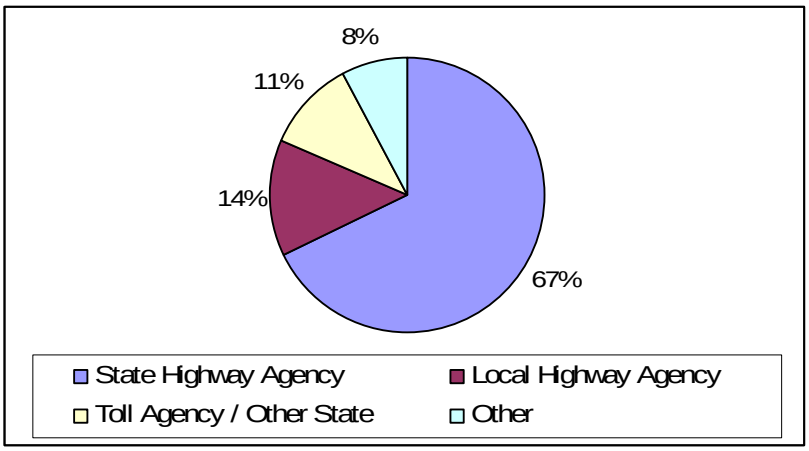

Figure 1 - Available Bridge Ownership by Agency Type

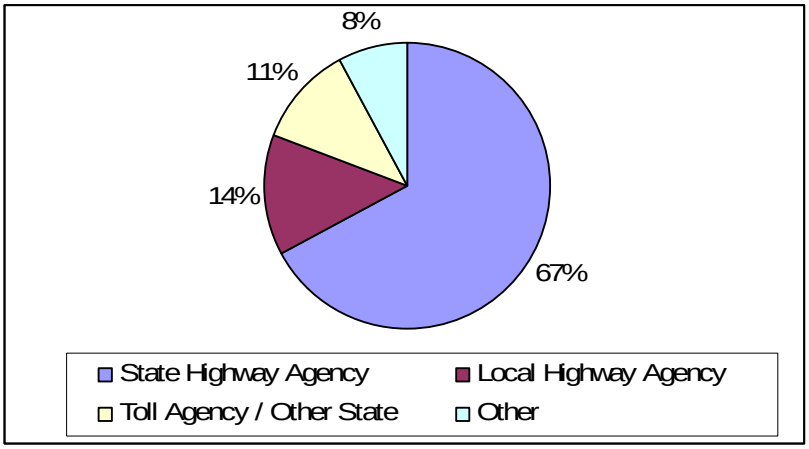

Figure 2 - Available Bridge Maintenance Responsibility by Agency Type

Clearly, the primary responsibility for bridge maintenance and responsibility for interstate river bridges lies with relevant State Highway Agencies. However, toll agencies and local governments each make up a small, but important, component of cross border bridges. Five bridges were examined in closer detail – three bridges that could be considered of national importance and two less important bridges. Selection was primarily based upon availability of information regarding these bridges. The five bridges are:

The Woodrow Wilson Bridge over the Potomac River between Maryland and Virginia

The U.S. 82 Bridge over the Mississippi River near Greenville, MS

The Benjamin Franklin Bridge over the Delaware River in Philadelphia

The Northampton Street Bridge over the Delaware River between Easton, PA and Philipsburg, NJ

The Missouri River Bridge over the Missouri River between Bellevue, NE and Iowa

Section 4.3.1 - Woodrow Wilson Bridge

The new Woodrow Wilson Bridge is being completely constructed by the Maryland State Highway Association through intergovernmental agreements with the Federal Government, the District of Columbia, and the State of Virginia.[90] The bridge crosses the Potomac River in the Washington, D.C. region just southeast of the City between Maryland and Virginia. The bridge under construction is a replacement bridge for a bridge originally opened in 1961 as part of the Washington Beltway, I-495, but is currently signed as I-95 – the primary North-South route on the east coast connecting Maine to Florida. As such the bridge serves not only as a major link in the inter-regional traffic of the Washington region, but also an extremely important link in the national transportation infrastructure.

The original bridge is a drawspan, 50' wide, six-lane facility opened to traffic in 1961. It was designed to be part of the beltway around Washington D.C., but after a decision was made not to complete construction of I-95 through the city, the main

[90] Robert Douglass, Robert Healy, Thomas, Mohler, and Shirlene Cleveland. "Adventures in Building Another Washington Monument: Woodrow Wilson Bridge project re-bidding outcome," *Transportation Research Board Annual Meeting CD-ROM*, (Washington, DC.: Transportation Research Board, 2004).

Interstate route was rerouted onto the bridge. As of 1991, the owner of the bridge was the U.S. Government with the FHWA acting as the agent of the U.S. government and maintenance was provided jointly by Virginia, Maryland, and the District of Columbia. Maryland was responsible for maintenance of the bridge itself, Virginia supplied the power and water to the bridge, and the District of Columbia operated the drawspan and maintained the machinery.[91]

After years of increasing traffic problems on the bridge, the four agencies responsible for owning and maintaining the bridge entered into a one-year competition for a bridge replacement in 1989. This process started the redesign of the bridge culminating in the failed bid replacement of 200_ described by Douglass, Healy, Mohler and Cleveland.

Section 4.3.2 - U.S. 82 Mississippi River Bridge

The U.S. 82 Mississippi River Bridge is a new bridge being constructed to replace an existing bridge near Greenville, MS. It is the largest cable-stayed bridge on the Mississippi with a length of 1,378 ft. on the main span with a total length of 3.84 miles when it opens to traffic in 2009.[92] It is being constructed to replace an existing bridge that opened to traffic in 1940 as part of one of the transcontinental routes.[93] According to a research study on navigational issues and the organization of the bid proposals, construction of the bridge was led by the Mississippi Department of Transportation.[94],[95] Data from the NBI indicates that the Mississippi DOT and

[91] *Woodrow Wilson Bridge Improvement Study – DEIS,* (Washington, D.C.: U.S. DOT, FWHA, Maryland DOT, VA DOT, D.C. Dept of Public Works, 1991).
[92] *2006 Bridge* (Jackson, MS; Mississippi Department of Transportation, 2006) http://www.greenvillebridge.com/2b_2006.htm (Last Accessed: August 31, 2006).
[93] *The Quest for the Bridge* (Jackson, MS; Mississippi Department of Transportation, 2006) http://www.greenvillebridge.com/2c_history.htm (Last Accessed: August 31, 2006).
[94] Michael Paulk, "Greenville's U.S. 82 bridge will be longest of its kind" in *Memphis Business Journal* (Memphis; American City Business Journals, Inc., April 13, 2001).

Arkansas DOT share rehabilitation and maintenance costs equally. This would indicated that responsibility for the bridge is shared jointly between the two Type C organizations with one agency taking the lead role in construction with the other agency providing funding support.

Section 4.3.3 - The Benjamin Franklin Bridge

The Benjamin Franklin Bridge spans the Delaware River between Philadelphia and Camden, NJ and was constructed between January, 1922 and July, 1926.[96] The bridge is signed as Interstate 676 and U.S. 30 and had an AADT of 87,158 vehicles with 4% truck traffic in 1991. The bridge is owned, operated, and maintained by the Delaware River Port Authority (DRPA) which owns four major bridges over the Delaware in Philadelphia – the Benjamin Franklin, the Walt Whitman, the Betsy Ross, and the Commodore Barry Bridge. The DRPA was originally formed in 1919 by approval of the legislatures of both New Jersey and Pennsylvania specifically for the creation of a crossing of the Delaware River that became the Benjamin Franklin Bridge. In addition to the four bridges, the DRPA, through its subsidiaries, operates a high-speed rapid transit rail line between New Jersey and Philadelphia and the unified ports of Camden and Philadelphia. At several points, the latest in 1988, New Jersey and Pennsylvania have renewed the bi-state agreement governing the DRPA.[97] Therefore, the DRPA is an independent organization created by two Type C entities, the State of New Jersey and the

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[95] Larry L. Daggett and Donald Willson, "Navigational Model Study Improves River Safety of New Bridge" in *TR News, 196* (Washington, D.C.; Transportation Research Board, May-June 1998) 32.
[96] *Benjamin Franklin Bridge* (Philadelphia; Delaware River Port Authority, 2006) http://www.drpa.org/drpa/drpa_bridges_bf.html (Last Accessed: August 30, 2006).
[97] *History* (Camden, NJ; Delaware River Port Authority, 2006) http://www.drpa.org/drpa/drpa_history.html (Last Accessed: August 30, 2006).

Commonwealth of Pennsylvania, specifically for coordinating infrastructure construction and operation common to both states.

Section 4.3.4 - Northampton Street Bridge

The Northampton Street Bridge crosses the Delaware River connecting the cities of Easton, PA and Philipsburg, NJ. It is a toll-free bridge with an AADT of 22,300 vehicles in 2005.[98] The bridge is owned by the Delaware River Joint Toll Bridge Commission (DRJTBC), a bi-state entity setup to own, manage, and maintain twenty (20) bridges located on the Delaware River between Pennsylvania and New Jersey from the Bucks County/Philadelphia line to the New York border with New Jersey. The DRJTBC operates thirteen (13) non-toll and seven (7) toll bridges over the Delaware River with tolls on the toll bridges completely financially supporting the non-toll bridges. The DRJTBC was formed in 1934 as a bi-state compact specifically to construct, operate and maintain bridges between the two states and the only major change in its responsibility came in 1984 when the DRJTBC assumed financial control over the non-toll bridges which until that time had been supported by annual appropriations from the legislatures of New Jersey and Pennsylvania.[99] The board is governed by a ten-member commission with five members, each appointed by the governor of the respective state, from each state represented.[100]

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[98] *Annual Average Daily Traffic* (Morrisville, PA; Delaware River Joint Toll Bridge Commission, 2006) http://www.drjtbc.org/default.aspx?pageid=9 (Last Accessed: August 30, 2006).
[99] *Delaware River Joint Toll Bridge Commission Financial Statements and Supplementary Information Years Ended December 31, 2005 and 2004* (Morrisville, PA; Delaware River Joint Toll Bridge Commission, 2006) 10.
[100] *Commissioners* (Morrisville, PA; Delaware River Joint Toll Bridge Commission, 2006). https://www.drjtbc.org/default.aspx?=pageid=8 (Last Accessed: September 5, 2006)

Section 4.3.5 - Bellevue, NE Bridge over the Missouri River

The Bellevue Bridge carries NE 370 / IA 370 across the Missouri River that forms the border between Nebraska and Iowa at Bellevue, NE, a small city located just south of Omaha. According to the NBI, the two-lane bridge was constructed in 1952 and had an AADT of 2,790 vehicles with 6% truck traffic in 2002. The 0.2-mile bridge is owned by the Bellevue Bridge Commission. Nebraska law allows counties and municipalities to create bridge commissions for the construction and operation of bridges between Nebraska and neighboring states, specifically allowing for the issuance of bonds and charging of tolls for payment of those bonds.[101] Examining those section of the Nebraska Code that deal specifically with County Bridge Commissions (Sections 39-855 to 39-877), Nebraska allows county or municipal governments to create a commission that has the power to enter into agreements with neighboring states, but that the bridge must be constructed to be supported by toll revenues and that the county government may not incur general indebtedness to finance the bridge.[102] The county that created the commission is also required to appoint a commission board composed of between three to five members appointed by the county government and the commission has the ability to perform the:

"purchase of existing bridges, the construction of new bridges or the operation, maintenance, repair, renewal, reconstruction, replacement, extension or enlargement of existing bridges, or bridges hereafter constructed or purchased."[103]

[101] Jon Bruning and Dale A. Comer, *Opinion on LB550; LB551; Termination Of Bridge Commissions For Interstate County Bridges And Transfer Of Their Duties* (Omaha; Office of the Attorney General of Nebraska, March 7, 2003).
[102] *Nebraska Code 39-855 to 39-856*.
[103] *Nebraska Code 39-870*

Interestingly, with regard to bridges owned by the State Department of Roads, Nebraska Law has a completely separate set of regulations. These regulations, spelled out in Sections 39-891 to 39-8,122 (known as "The Interstate Bridge Act of 1959") govern the relationship of the Department of Roads with respect to interstate bridges, specifically that all facilities constructed, operated or maintained by the DOR shall be toll-free and that the cost and maintenance of the bridge shall be determined by how much of the bridge lies within the territory of the State of Nebraska.[104],[105]

Nebraska allows two types of interstate bridges. The first is a separate commission set up by a county, but independent of the county, that has the power to plan, build, construct, and maintain a bridge in cooperation with an agency of the other state – in other words a new entity set up to build and maintain the bridge. Nebraska has three of these commissions – the Bellevue Bridge Commission, the Burt County Bridge Commission, and the Plattsmouth Bridge Commission. The other types of bridges are those controlled by the DOR, a Type C entity, that has the ability to negotiate with other Type C entities – or a bi-lateral agreement between two states.

Section 4.4 – TEN-T: the Challenge of Cross Border Segments

As noted before, the current Trans-European transport network consists of 30 corridors defined by the European Commission. This dissertation is interested in the cross border segments of these corridors, resulting in the exclusion of Corridor 15 – the Galileo Satellite Project and Corridor 21 – Motorways of the Sea since these corridors do not have physical cross border segments. The remaining twenty-eight corridors can be broken into one hundred sixteen (116) distinct segments, of which thirty-four are distinct cross border segments with infrastructure ranging from new

[104] *Nebraska Code 39-8,121*
[105] *Nebraska Code 39-897*

roadways, new railways, bridges, and tunnels. As of Jan. 1, 2006, four of these segments were complete and another two were under construction.

These thirty-four cross border segments present some fascinating projects including the Chunnel, major bridges such as the new span between Denmark and Sweden, and two major trans-Alpine tunnels. Additionally, some of the more conventional projects such as new motorways or railways are being planned in countries which have a history of recent innovation in the policy arena such as Slovakia. One priority axis, Priority Axis 2 – Paris, Brussels, Koeln, Amsterdam, London High Speed Train, is particular interesting since it has four distinct cross border segments – Belgium / France, Belgium / Netherlands, Belgium / Germany, and France / United Kingdom – of which two segments are complete and two are under construction.

The Channel Tunnel and Paris – Brussels segments were completed in the 1990s while the Belgium / Netherlands and Belgium / Germany portions are scheduled to be completed in 2007. Each of the cross-border segments of this axis are worthy of investigation in their own right as they, along with the completed Oresund Bridge, are seen as the most tangible benefits to date of the importance and potential of the TEN-T network. Therefore, these five segments of the TEN-T – the four cross border components of the PBKAL Axis and the Oresund Bridge – will be examined in close detail below. Other potential segments, such as the Fehmarn Fixed Link between Denmark and Germany, the new Brenner Tunnel under the Austrian Alps, or the cross border segments of the various motorways in the ascension countries are still

in planning and funding stages, just started construction, or still in simply lines on a map respectively.[106],[107],[108]

Section 4.4.1 - PBKAL Segments

The goal of this corridor, really a network, is to enable a three hour travel time between Amsterdam and Paris via Brussels and Cologne and Paris via Brussels, an hour and a half travel time between Paris and Brussels, and a two and a half hour travel time between Paris and London and Paris and Brussels with connections in Brussels to Amsterdam and Cologne. In 2005, the completed sections of the network were the high speed line between Paris and the Channel Tunnel, the high speed line between Paris and Brussels, the Channel Tunnel, and the high speed line in Belgium between Leuven and Liege. The major segments under construction included the entire length of the line (HST-Zuid) in the Netherlands between Amsterdam and the Belgian border, the high speed line between Brussels and Leuven, the high speed line between Liege and Aachen, and the tunnel under Antwerp to allow trains to access the central station in Antwerp. International services operating on the various parts of the network in 2005 include the Eurostar between London and Paris or Brussels, the Thalys between Paris and Brussels continuing onto Amsterdam or Cologne with ancillary services to CDG/Marne-la-Vallée and seasonal services to the French Alps and Marseille, ICE trains between Brussels and Frankfurt via Cologne, TGV trains to various destinations on the French TGV network, and international NS trains providing services between Brussels and the Netherlands. In 2007, the

[106] Torsten Teichmann, "Faellt die Bruecke ins Wasser?" in *Luebecker Nachrichten* (Luebeck, Germany; Luebecker Nachrichten, Febuarary 9, 2006).
[107] *Brenner Tunnel: construction of the exploratory gallery begins – IP/06/880* (Brussels: Directorate General for Energy and Transport, June 29, 2006).
[108] *Interview of Jiri Vesely* (Brussels: Permanent Representative of the Czech Republic to the European Union, April 4, 2006).

NeederlandsSpoorwagens (NS) trains will be replaced by the High Speed Alliance, a new operating company, to operate international trains between Belgium and the Netherlands.

Section 4.4.1.1. - Paris – Brussels Axis

The concept of a high-speed train line between Paris and Brussels had been in planning stages and discussion since 1972 when the SNCF was experimenting with high-powered turbine trains and the Europolitan concept prior to the gas-crises of the 1970s.[109] Additionally, throughout the 1980s, Herman de Croo, the Belgian transport minister, had been working on and developing a project for TGV network in Belgium, culminating in the release of the proposal in 1986 by an intergovernmental group consisting of members of France, Belgium, the Netherlands, and Germany, indicating a TGV network in Belgium centered on Brussels with stops in Zaventum and links to Germany and the Netherlands.[110] This project was not well received by the Belgian regions partly because the ministry had not consulted the regions extensively enough, an important consideration since the regions are responsible for issuing the construction permits that would allow the project to proceed.[111] However, this reluctance has more impact on the other sections of the proposed network than on the Paris – Brussels link, since this segment was feasible by itself with passenger projections of more than 6 million trips annually.[112] Additionally, the two proposed routes of the Paris – Brussels link were essentially the same within Belgium, with most of the variation on the routes on the French side of the border.[113] The work did

[109] Herman Welter, *TGV & Chunnel*, (Leuven: Davidsfond, 1993). pg. 40
[110] *Le T.G.V. passera-t-il par le Brabant?*, (Brussels: Conseil Economique Régional pour le Brabant, 1986).
[111] Welter, 16.
[112] *Le T.G.V. passera-t-il par le Brabant?*, 4.
[113] *Le T.G.V. passera-t-il par le Brabant?*, 10.

continue on development of the project with the initial environmental studies starting in 1989 by the SNCB followed the signing in 1990 of the intergovernmental agreement to construct with LGV, which included an agreement to start construction simultaneously in 1993 in Wallonia, Flanders, and Brussels.[114] While construction did start in all three regions in 1993, the sections in Wallonia south of Brussels and in the Brussels region proceeded much more quickly with the opening of the first 15-km of dedicated high-speed line in 1996 between the French border and Antiong followed by the final 71-km of dedicated line between Antiong and Brussels. The lines to the Dutch and German borders are scheduled to open in late 2006 / early 2007 and are discussed in a different section. All construction and maintenance of the dedicated high-speed line in Wallonia was under the responsibility of the SNCB or, after 2005 – its infrastructure subsidiary Infrabel.

On the French side of the border, French government decided on construction of the line, including the interchange east of Lille to Brussels in October of 1987, just after the signing of the treaty with Britain regarding the Channel Tunnel. Studies were conducted until 1989 when the French government declared TGV-Nord to be considered a public utility allowing major construction to begin. The first segment of the line, a 160-km segment between Paris and Arras, opened 44 months later in June, 1993 with the entire 330-km line open by September, 1993. The major driver for the construction deadlines was the element in the Channel Tunnel treaty that specified that the tunnel was to be operational 69 months after the signing of the treaty in October, 1987 – or a tunnel opening in June 1993. All of the environmental studies and construction operations were conducted and operated by SNCF.[115]

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[114] *Le TGV en Belgique: Dossier d'information,* (Brussels: Société National de Chemins de Feu Belgique, 1997).
[115] G. Roques and G. Lebailly, "Le génie civil du TGV Nord," in *Travaux*, (Paris: Editions Science et Industrie, April, 1992).

Section 4.4.1.2 - Brussels – Amsterdam Segment (HST-Zuid)

This segment of the PBKAL project links Brussels with Amsterdam via Antwerp and Rotterdam. While construction on this segment of the project began in Belgium in 1993 according to the national agreement to start construction in all three regions in 1993, this segment is not expected to be open and fully operational until April of 2007. In Belgium, construction work consisted of two major factors – upgrading of existing tracks between Brussels and Antwerp-Berchem station including a new viaduct in Mechelen and construction of a new North-South tunnel (Jonction Noord-Zuid) underneath central Antwerp and the Scheldt River to make Antwerp Centraal station a through station rather than a terminal station. Initially, another alternative had a shared track with the branch to Cologne until Heretals which uses a new route passing near the Brussels National Airport and east of Antwerp and Mechelen. This alternative was considered less expensive because of the elimination of the tunnel and viaduct construction in urban areas required by the selected alternative.[116] All construction on the Belgian network was undertaken and managed by SNCB until 2005, when Infrabel took control of the project. The line between Brussels and Antwerp is not a new line, but an upgrade of the existing line to allow trains to operate at 160 kph.[117] This upgrading of the line was completed in 2002. Once entering Antwerp, a new line has been constructed leaving Antwerp Berchem Station, through a tunnel underneath the city center serving Antwerp Centraal, and then emerging on the north side of Antwerp and continuing on a dedicated and separate track to the Dutch border. This North-South junction consists of a 2.5 km

[116] *Le T.G.V. passera-t-il par le Brabant?,* (Brussels: Conseil Economique Régional pour le Brabant, 1986).
[117] *L'axe nord,* (Brussels ; Société nationale de chemins de feu belge, 2006) http://www.b-rail.be/corps/F/projects/project_tgv/lines/north/index/php Accessed: April 17, 2006.

tunnel starting on the viaduct between Antwerp-Berchem Station and Antwerp Central and a 1.3 km viaduct on a new right-of-way before rejoining the existing ROW on the way to the Dutch border. Additionally, a new station, Antwerp-Luchtbal has been included in this construction as the North-South junction will also be used for through suburban services within Antwerp.[118] This section of the line is mostly complete in the spring of 2006 and is expected to be in operation in 2007. The 37-km section between the North-South junction and the Dutch border was completed in April 2006 and will allow service at 300 kph.

On the Netherlands side of the border, construction has been controlled under a Design-Build-Operate-Maintain (DBOM) contract awarded to a consortium of companies called Infraspeed. Owners of Infraspeed include Nederlands Spoorwagen and KLM as well as construction firms. The construction is of a dedicated high-speed line and upgrading of existing lines of approximately 108 km between the Belgian border and Amsterdam.[119] The aim is reduce travel time between Amsterdam and Rotterdam from 1h05 to 23 minutes allowing for just over 3 hours to Paris from Amsterdam.[120] In the Netherlands, the line will remain the property of the Dutch government, but will be operated as a concession until 2030 with the government paying 230 guilders annually for 99% availability. A major portion of the project consists of a new 4.5 mile (7.2 km) tunnel underneath the Groene Haart of the central Netherlands between Amsterdam and Rotterdam that preserves some of the remaining open space available in the densely populated western portion of the country.

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[118] *La junction nord-sud d'Anvers,* (Brussels ; Societe de chemins de feu belge, 2006). http://www.b-rail.be/corp/F/projects/project_tgv/works/junctionnorthsouth Accessed : April 17, 2006.
[119] PLANCO Consulting, Gmbh, *TEN-Invest : Transport Infrastructure Costs and Investments between 1996 and 2010 on the Trans-European Transport Network and its Connection to Neighboring Regions, including an Inventory of the Technical Status of the Trans-European Transport Network for the Year 2000* (Luxembourg; European Investment Bank, 2003)
[120] *HSL Zuid High Speed Rail Line – Belgium/Netherlands* (London; Railway Technology, 2006) http://www.railway-technology.com/project_printable.asp?ProjectID=1661 Accessed: March 3, 2006

Construction of the line started in the Netherlands in 2001. From the Netherlands point of view, the alignment through Antwerp was preferred compared to the Belgian preferred alignment east of Antwerp because of ability to directly serve the Flemish speaking city.

Section 4.4.1.3 - Belgian – German Border Segment

This segment of the PBKAL project links Brussels and Cologne via Liège and Aachen. Construction on the Belgian side of the border includes four major projects – quadruple tracking of the line between Brussels-Noord and Leuven, a new line between Leuven and Warrem, a new station at Liège, and upgrading, including a new tunnel, of the line between Liège and the German border. Initially, this alignment was one of three proposed alignments with the others being this alignment with a new section between Warrem and the German border passing north of Liège or a different alignment that shared tracks with the Amsterdam alignment until Mechelen and then used a new alignment passing in northern Flanders through the province of Limburg to the German border. The chosen alignment was selected after a strong protest by the province of Limburg and the extra cost of constructing a new station in northern Liège.[121]

The infrastructure for the line from Brussels to the German border includes adding two new tracks between Brussels and Leuven, for a total of four tracks with the two inner tracks will dedicated to high speed international and domestic services at a speed of 200 kph (125 mph). The outer tracks will be reserved for conventional domestic intercity and commuter services.

[121] *Le T.G.V. passera-t-il par le Brabant?*, (Brussels: Conseil Economique Régional pour le Brabant, 1986).

Between Leuven and Ans a new double-track line is in operation on a new alignment where trains can operate at 300 kph (187.5 mph), though only the international trains operate at that speed. Domestic trains operate at 200 kph (125 mph) along this segment – similar to the speeds reach by AMTRAK service between Washington and New York.

Between Ans and Liège, the line rejoins the existing tracks to enter into the main station in Liège. After leaving Liège, a double-track line also on a new alignment is under construction east of Liège to the German border including a 6.5 km (4 mile) tunnel where trains will operate at 260 kph (162.5 mph).

Section 4.4.1.4 - Channel Tunnel

A tunnel under the English Channel had considered off and on ever since 1751 when a proposal was made to Louis XV with various other proposals surfacing in 1802, 1859, 1861, boring in 1883, 1919, and 1929.[122] After WWII, construction actually started on the project in the early 1970s until the Labor Government in the United Kingdom. pulled out of the project in 1975.[123] However, less than ten years later there was serious, and ultimately successful, effort to construct the tunnel culminating with the signing of the treaty to construct the tunnel by President Mitterand and Prime Minister Thatcher on January 20, 1986.[124]

Given Lady Thatcher's record of reforms and privatizations, she supported the project only under the condition of no public investment – necessitating a completely private venture. This was consistent with her on-going policies of ending transport subsidies such as the elimination of operational subsidies for Inter-City trains by

[122] Richard S. Grayson, "The British Government and the Channel Tunnel, 1919 – 39," in *Journal of Contemporary History 31, no. 1* (London; Sage Publications, Ltd., Jan 1996) 126.
[123] *The Story of the Channel Tunnel* (London;) 1.
[124] Welter, 78.

BritRail in the mid-'80s.[125] Indeed her strong support of the project was considered surprising, though it is possible her support of the project was a gift to President Mitterand in exchange for his final support in obtaining the British rebate from the European Community.[126] However, because of state ownership of all European railways at the time, there was no single company to build, own, and operate the tunnel since there were no private railway companies in Europe.[127] To meet the requirement for private sector participation, two companies were formed – one French, France Manche SA, and one British, the Channel Tunnel Group – each consisting of a consortium of construction and finance companies, that in turn combined to form a single consortium called TransManche Link. Recognizing that the construction consortiums would not be able to operate the trains once the tunnel was complete, ownership of the tunnel was transferred from TransManche Link to the Anglo-French Operating company – Eurotunnel – on December 10, 1993.[128]

While the U.K. officially wanted no public participation in the investment of the Channel Tunnel, the Planco Consulting Report of 2003 indicates the U.K. had planned or had invested over 10 billion Euros in the U.K. portion of the PBKAL axis.[129] Part of this is undoubtedly a result of the spiraling construction costs that occurred during construction raising the price of the tunnel from $8 billion in 1985 to $16 billion in 1995 in addition to Transmanche Link being unable to tap into the government bond markets during the late 1980s and having to rely on private interest

[125] John F.L. Ross, "High-Speed Rail: Catalyst for European Integration?" in *Journal of Common Market Studies 32, no. 2* (London; Blackwell Publishing, Ltd. June, 1994).
[126] Graham Anderson and Ben Roskrow, *The Story of the Channel Tunnel*(London; Chapman & Hall, 1994) 7-8.
[127] Colin J. Stannard, "Tunnel under Channel unearths money woes," in *Forum for Applied Research and Public Policy 13, no. 1* (Knoxville, TN; University of Tennessee, Energy, Environment and Resources Center, Spring, 1998) 13 - 18
[128] Stannard, 13.
[129] PLANCO Consulting, Gmbh, Table 6-27.

rates during a time when those rates were increasing significantly.[130] In fact, the Eurotunnel Group still faces financial difficulties in 2006 with over 9 billion Euros in debt and squabbles with its creditors over refinancing that could place the company into receivership in February, 2007.[131]

In northern France, there was considerable discussion about the impact the Channel Tunnel would have on the struggling region of Nord-pas-de-Calais and its major city – Lille. According to Menerault, the SNCF originally proposed a link to the Channel Tunnel south of Lille, while the community leaders of Lille preferred a station, defined in the "Plan de Flandres," in Lille itself requiring all London trains to/from Brussels and Paris to call at Lille. Additionally, the coastal towns of the Dunkirk, Calais, and Boulogne also requested and received a station at the tunnel mouth in addition to the terminal facility for shuttle trains. While the station in Lille has been successful with 25 trains/day in 1997, the coastal station is relatively underutilized with only 3 trains/day calling in 1997 at Fréthun.[132] By 2006, Fréthun is not even listed as a station on the main operator running the trains between the U.K. and the continent.[133]

Section 4.4.2 – Operations of non-UK Services Network

Three operators provide service on the LGV between France and Belgium: Eurostar to Lille and London, SNCF to various cities in France outside of Paris such as Marseille, Lille, Bordeaux, and Montpellier, and Thalys to Paris, Marne-le-

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[130] Stannard, 17.
[131] « Delai d'une semaine pour Eurotunnel » in *Le Soir – économie* (Brussels ; Le Soir, July 25, 2006).
[132] P. Menerault, "Dynamiques et politiques régionales autour du tunnel sous la Manche et du T.G.V. Nord," in *Annales de Géographie 106 no. 593-594* (Paris; Société de Géographie, Jan – Apr 1997). 5 – 33.
[133] *Timetables* (London; Eurostar Group, Ltd. 2006). http://www.eurostar.com/dynamic/_SvBoTimeTableCriteriaTerm?_TMS=1157395236523&_DLG=SvBoTimeTableCriteriaTerm&_LANG=UK&_AGENCY=ESTAR (Last accessed: September 4, 2006).

Vallée/CDG and seasonal service to the French Alps and Marseille. There are no conventional trains on this line. The trains that run on this line are required to be compatible with two types of current that power the train – 3000 V continuous current on conventional Belgian lines and 25,000 V alternating current on dedicated high-speed lines in France and Belgium. Additionally, within Belgium, there are domestic high-speed services between Brussels and Liège and Brussels and Antwerp as well as international services provided by Deutsche Bahn and NS. Aside from the operational difficulties noted above, each of the train operators have different ownership structures.

Section 4.4.2.1 - SNCF

SNCF runs and owns all of their trains in both countries, with 40 units of the 90 TGV-réseau trainsets designed to be able to run in Belgium. Like SNCB, SNCF is separated, officially, into an operating and infrastructure company with the SNCF being responsible for operating the trains and maintaining the rolling-stock while RFF is responsible for the infrastructure. Therefore, SNCF services on the Belgium – France axis are operated completely by SNCF as extension of the national SNCF system in France.

Section 4.4.2.2 - Thalys

Since 1996, Thalys International has operated an extension of their Paris – Brussels service to Liège and on to Cologne. There are six round-trips per day with a travel time of 2:28 minutes between Brussels and Cologne, with a 53 minute travel time between Brussels and Liège (98 km ~ 61miles), 42 minutes between Liège and Aachen (70 km ~ 44 miles), and 42 minutes between Aachen and Cologne (70 km ~

44 miles). In Brussels, the train joins with another Thalys trainset from Amsterdam to continue onto Paris. Thalys is an independently registered company, but ownership in the company is in the hands of the state railway operators of France (SNCF) and Belgium (SNCB) with partnerships with the state railway operators of Germany (DB) and the Netherlands (NS).[134]

Originally formed in 1995 as Westrail, the company was created with SNCF and SNCB as share holders and with joint ventures with NS and DB. Operations started in 1996 between Paris, Brussels, and Amsterdam with high speed line in Belgium coming into operation in 1997. In 1999, Westrail became Thalys International continuing to be headquartered in Brussels. Interestingly, the trainsets are owned by SNCB and SNCF. Finally, agreements have been reached with several Partners with several airline companies – Air France in 1999 for flights BRU-CDG, KLM in 2002 for flights Schipol-Brussels, and Air Austral in 2005 for flights BRU-CDG – that allows Thalys services to be code shared as airline flights.[135]

Therefore, Thalys services operating on the Belgium – France high-speed line are operated as a separate entity with a different brand and distinct identity, though completely owned by the national railway operating companies of France and Belgium.

Section 4.4.2.3 - Domestic Belgian Services

This high-speed domestic service travels the length of the country between Eupen near the German border and Oostende on the coast with 15 trains in each direction each weekday. Between Liège and Brussels, it travels on the same line as the

[134] *Thalys: Dossier de presse,* (Brussels: Thalys International, 2006).
[135] *Thalys: Dossier de presse,* (Brussels: Thalys International, 2006), 3.

high-speed international services, with an additional stop at Leuven, and is indistinguishable from the rest of the SNCB fleet.

Section 4.4.2.4 - DB ICE Services

Deutsche Bahn, the main German intercity rail operator, operates three round trips a day between Brussels and Frankfurt stopping in Liège, Aachen, and Cologne. DB utilizes three ICE-3 multi-current trainsets. DB operates and staffs the ICE services independently of SNCB and assumes all commercial risk for the operation of this service.[136]

Section 4.4.3 - Channel Tunnel Operations

Prior to taking over full control of the tunnel in 1993, the Eurotunnel Group signed a contract with SNCF and the British Rail Board (BRB) under which SNCF and BRB are guaranteed 50% of available capacity of the tunnel until 2052.[137] In 2004, the Eurotunnel Group reported three types of operations through the Channel Tunnel – Shuttles service (drive-on/drive-off trains for trucks, cars, and buses), Eurostar services, and freight operations.[138] Channel Shuttles are operated by the Eurotunnel itself, freight operations by independent freight operators – primarily SNCF, and Eurostar services by its management.

[136] *Rapport annuel 2004 activités,* (Brussels: Société nationale des chemins de fer belges, 2005).
[137] *Eurotunnel's Network Statement 2004 Timetable* (Coquelles Cedex, France; Eurotunnel Group, 2004) 2.
[138] *Traffic Volume over 5 years* (Coquelles Cedex, France; Eurotunnel Group, 2005) http://www.eurotunnel.com/ukcP3Main/ukcCorporate/ukcAboutUs/ukcTraffic/ukpTraffic.htm (Last Accessed: September 4, 2006).

Section 4.4.3.1 - Eurostar

Eurostar is the brand name of the most noticeable train operations using the Channel Tunnel as the high-speed trains that operate between London and Paris or Brussels. Public services on the Eurostar began on November 14, 1994 and the company was originally owned jointly by British Rail, SNCB, and SNCF with each operator responsible for running the trains on British, Belgian, and French soil respectively. With the privatization of British Rail in 1996, the British Rail ownership control was transferred to London & Continental Railroad, later Eurostar UK Ltd. This second company awarded a management contract in 1998 to InterCapital and Regional Rail Ltd, whose owners include SNCB (15%) and SNCF (35%). Finally, in 1999, the Eurostar Management Group was formed with ownership by SNCB, SNCF, and Eurostar UK with each of the three railroads represented on the board.[139] Therefore, Eurostar Group, the operator of the Eurostar trains is owned by three companies – SNCB, SNCF, and EUKL. However, EUKL has given control of management and operations of trains on its territory to a management group in which 50% of the ownership is by SNCB and SNCF – its partners in the Eurostar Group.

Section 4.4.4 - Oresund Bridge

The Orsesund region is located at the entrance to the Baltic Sea and consists of the Copenhagen capital region of Denmark to the west and the Swedish city of Malmo to the east. Given the long historical ties between the two sides of the strait – southwestern Sweden was ruled by Denmark until the 17th century – through the 20th century various proposals for constructing a fixed link across the straights have been proposed. After a strong push in the 1960s for a fixed link, in 1991, the Danish and

[139] *Ownership & Structure* (London; Eurostar Group, Ltd., 2005) https://www.eurostar.com/UK/be/leisure/about_eurostar/company_information/ownership_structure.jsp (Last accessed: February 2, 2006).

Swedish governments finalized an agreement to construct what is now the Oresund Bridge.[140]

Section 4.4.4.1 - Construction

The Oresund Link is consists of a main bridge, two approach bridges, and a tunnel consisting of a 16-km motorway and railway line. An agreement between the two states' government was reached in March of 1991 and ratified by the respective parliaments in August of 1991. In January 1992, the Oresundbro Konsorteit was formed which would be the owner and operator of the link, and which signed the contracts for the construction of the bridge and tunnels in July of 1995. The bridge opened on July 1, 2000.[141] In its first year of operation, the bridge account for half of all travelers between Denmark and Sweden crossing the sound.[142]

Section 4.4.4.2 - Operation

The Orsundsbro Konsorteit is a private company charged with owning and operating the Oresund Link infrastructure. The Konsorteit operates the toll-facilities and is responsible for paying off the construction bonds. It was also the client for the construction companies that constructed the infrastructure. The Konsorteit is jointly owned by the Danish Company A/S Oresund and the Swedish Company Svensk-Danska Brofoerbindelsen; both of these companies are in turned owned by the their respective states – outright by the Danish government in the case of A/S Oresund and 50% split between the Swedish Highway Operator and the Swedish Rail Operator for

[140] Bjorne Anderson, "Danish-Swedish co-operation in the Oresund Region" in *Nordic Region-Building in a European Perspective*, eds. Harald Baldersheim and Krister Stahlberg, (Brookfield, VT: Ashgate Publishing, 1999).
[141] *History – OresundBron*, (Copenhagen; Oresundbron Konsorteit, 2006) http://osb.oeresundsbron.dk/documents/document.php?obj=1009&printmode=1 (Accessed March 13, 2006).
[142] Allen Zeyher, "Building a European Region," *Roads & Bridges 38, no. 8*. August, 2001.

the Swedish Company.[143] The Konsorteit pays for the bridge by collecting tolls from motorists and from access charges by trains using the bridge and expects to pay off the tolls by 2027, though this has since been revised to 2035.[144],[145] While initial traffic on the bridge did not meet expectations, according to the latest annual report, toll revenues and traffic first met forecast figures in 2004, though traffic was still only around 11,000 vehicle per day in 2004.[146],[147] While rail fees for the bridges are governed by an intergovernmental agreement between Denmark and Sweden, road tolls are set by the Konsorteit.[148] Interestingly, while the railway infrastructure owners pay a fixed rate to the Konsorteit to access the Link, they in turn sell those access rights to the railway operators in Denmark and Sweden.[149]

[143] *Annual Report* (Copenhagen; Oresundbro Konsorteit, 2004).
[144] Allen Zeyher, "Building a European Region," in *Roads & Bridges 38, no. 8*. August, 2001.
[145] *Facts worth Knowing About the Oresund Bridge*, (Copenhagen; Oresundbro Konsorteit, 2005).
[146] "A not-so-popular Nordic Bridge," in *The Economist 357, no. 8191*. (London; The Economist Group, Ltd., October 7, 2000).
[147] *Annual Report* (Copenhagen; Oresundbro Konsorteit, 2004).
[148] *Annual Report* (Copenhagen; Oresundbro Konsorteit, 2004).
[149] *Facts worth Knowing About the Oresund Bridge*. (Copenhagen; Oresundbro Konsorteit, 2005)

CHAPTER 5

ANALYSIS OF DESCRIPTIONS

5.1 – Types of Organizations Found

This section presents the types of cross-boundary organizational arrangements found in each of the areas examined in the previous chapter. Each of the four main types of projects is presented along with the types of organizational arrangements that govern the provision of cross-boundary infrastructure or services.

5.1.1 – U.S. Metropolitan Regions

The examination of metropolitan areas revealed several different types of organizational arrangements that govern the provision of cross-boundary transportation infrastructure and services. First were intergovernmental agreements, usually in the form of bi-lateral agreements between transit operators, which allow passengers to transfer between systems or allow an operator to operate outside of its territory. Examples of this type of arrangement include the reciprocal fare agreements in place in Atlanta between MARTA and the other suburban systems and the agreements in place in Miami. In addition to bi-lateral agreements between agencies operating within their specific jurisdiction, there are also regional providers such as the GRTA in Atlanta, DART in Dallas, RTD in Denver, and Sound Transit in Seattle. Each of these agencies is similar with the respect that they all operate fixed route transit service across political boundaries, own and operate, or have the ability to own and operate, cross-boundary fixed guideway systems, and have their service areas defined by local – either county or municipal boundaries. However, there is a major difference between some of these agencies. Many of these agencies require the

people within their localities to approve their ability to operate, usually through a referendum. Examples of this type are DART and Sound Transit whose formations both required a public referendum. In contrast, GRTA and RTD while functioning in a similar manner to Sound Transit and DART, are actually creatures of the state government and did not a require a referendum for their creation and do not require one for their expansion of service area.

Next is a service whereby a local government turns over operation of the transit service to a completely separate entity and only provides the funding for the service. These types of agreements in metropolitan transit appear to take place mostly between small municipalities and already operating transit agencies such as the City of Canton's express bus service agreement with CCT in Atlanta and MTD's agreement with the smaller municipalities who are not part of the consolidated Miami-Dade government. Finally, the TRE commuter rail service in Dallas represents another type of arrangement – two equivalent agencies creating a third agency controlled by them to run what appears to be a separate service. Table 12 presents the types of service arrangements and where they are present in metropolitan areas.

Table 12 – Arrangements of Cross-Boundary Transit Services in the United States

Type of Arrangement	Location
Intergovernmental Agreements	Atlanta MARTA – CCT MARTA – GRTA MARTA – GCT MARTA – C-trans Houston METRO – TxDOT-HCTA Miami MTD – Broward County MTD – Tri-Rail Broward County – Tri-Rail Seattle Puget Pass (Pierce Transit, King County, Community Transit, Sound Transit)
Third Party Agency geographical area political representation	Atlanta MARTA Dallas DART DCT Miami Tri-Rail Phoenix Valley METRO Valley METRO Rail Seattle Sound Transit
Third Part State Agency	Atlanta GRTA Denver RTD
Government Pays another entity to operate service	Atlanta City of Canton – CCT Miami MTD – Local Municipalities
Distinct Operation with shared funding	Dallas Trinity Rail Express Seattle Intercity Transit-Pierce Transit Bus Operations

5.1.2 – Commuter Rail Arrangements

In the arena of commuter rail operations there are several types of arrangements. First, similar to GRTA or RTD in Denver, are state agencies created by the state government – in this case the Massachusetts Bay Transportation Authority as a creature of the Commonwealth of Massachusetts. However, the

MBTA also operates an intergovernmental agreement with the State of Rhode Island whereby Rhode Island pays the MBTA to purchase trains and operate a specified type of service between Massachusetts and Rhode Island, similar to the arrangement made between the City of Canton and Cobb Community Transit in Atlanta.

The most common type of commuter rail agency seems to be a separate agency whose board and operations represent a specific geographical area such as NICTD and the South Florida Regional Transportation Authority. Interestingly, while the NICTD is authorized to operate within northern Indiana, it is not a recognized entity within Illinois. Therefore, to cross into Illinois and serve Chicago, the NICTD negotiates a contract with Metra, the owner and operator of the line the NICTD uses in Illinois. The other type of arrangements is again a separate agency, but one set up by two regional organizations – the Virginia Railway Express which is a cooperation between two MPOs in Northern Virginia. This arrangement is similar to the arrangements between DART and The T in Dallas for operating the Trinity Railway Express and between Intercity Transit and Pierce County Transit in Seattle. Table 13 presents the types of organizational arrangements found with regard to U.S. Commuter Rail Services

Table 13 – Arrangements of U.S. Commuter Rail Services

Arrangement	Location
Intergovernmental Agreement / Contract	Boston Pilgrim's Pride (RI and Massachusetts) Northern Indiana NICTD – Metra
State Agency	Boston MBTA
Distinct Operation with shared funding	Northern Virginia Virginia Railway Express
Third Party Agency geographical area political representation	Northern Indiana NICTD Southeastern Florida SFRTA Nashville RTA Pennsylvania SEPTA

5.1.3 – Bi-State River Bridge Arrangements

Bi-state River Bridges have several previously seen types of organizational arrangements. First is an intergovernmental type agreement specifying the roles and funding responsibilities for each agency involved similar to the reciprocal transfer agreements used by MARTA in Atlanta with its suburban transit partners. Here, the agreements such as the old agreement dealing with the Woodrow Wilson Bridge or between the Nebraska Department of Roads and its neighbors specify maintenance roles and the percentage responsibility each agency has for rehabilitation. The available information from the NBI suggests that this arrangement of a shared responsibility for maintenance and rehabilitation costs appears to be the primary way interstate bridges are operated in the United States with over 65% of available bridges owned and maintained by a state highway agency.

As opposed to maintenance and ownership, construction of the interstate bridges appears to function in a different manner with both of the bridges examined, the Woodrow Wilson Bridge and the U.S. 82 Greenville Bridge, having one state

agency take the lead and controlling the construction of the bridge. It would appear that while funding for rehabilitation and replacement may be split between states, in construction, one entity takes the lead for construction with that agency maintaining primary control during construction. In other words, while both states may pay to build or replace the bridge, only one state controls the actual construction of the bridge. In essence, the state that is not constructing the bridge is paying the other state to construct the bridge.

For the minority of bridges that are not owned by a state highway agency, the second most common type of agency is a third party agency, usually a form of toll authority. The investigation discovered two types of toll authorities – bi-state authorities that owned multiple bridges and local authorities set up for the construction of a single bridge. The bi-state authorities appear to be set up with equal representation by both states and are governed by a bi-state compact agreement. The local authority examined, in this case, the code governing Nebraska's county toll bridge authorities, is an example of the state giving a lower level of governance authority to negotiate with the powers of the state. On thing both types of authorities have is that while they are empowered to issue and take on debt, that debt is not secured by the state or any other public government. The organizational arrangements found when examining U.S. bi-state river bridges are presented in Table 14.

Table 14 – Arrangements of U.S. Bi-State River Bridges

Arrangement	Location
Intergovernmental Agreement	Woodrow Wilson Bridge Old agreement for maintenance and operation Nebraska DOR agreements with neighboring states
Third Party Agency with board representing geographical area	Bellevue, NE Bellevue Bridge Commission Benjamin Franklin Bridge Delaware River Port Authority Northampton Street Bridge Delaware River Joint Toll Bridge Commission
One Agency takes control of construction	Woodrow Wilson Bridge Construction of replacement bridge U.S. 82 Greenville, MS Construction led MsDOT

5.1.4 – TEN-T Arrangements

There are three basic types of arrangements that seem to predominate with cross-border infrastructure construction in the European Union. First, with regards to construction, with the construction of the land-based rail system, each country seems to have constructing and maintaining the infrastructure located on its territory, but with no responsibility for operations over the infrastructure. Operations over these pieces of infrastructure falls into two types – two or more national operators partnering to create a third operational entity or an operator maintaining its identity and paying the infrastructure owner user charges for the use of its track. Each of these arrangements have been seen before – a third operational entity in the case of Trinity Rail Express and Virginia Rail Express comparable to the Thalys and Eurostar operations, at least organizationally if not in level of service or technology used, and the payment of NICTD to Metra regarding access to tracks within Illinois comparable to ICE and TGV services into Belgium over the Infrabel network.

With the two cases that require specific piece of infrastructure – i.e. a bridge or tunnel – a separate entity was created specifically to construct, own, and operate

the infrastructure, though in the case of the Channel Tunnel the constructing entity was distinct from the owning/operating entity. This type of arrangement has also been seen before as with the creation of the Metropolitan Atlanta Rapid Transit Authority, the Delaware River Joint Toll Bridge Commission, and the South Florida Regional Transportation Authority. The organizational arrangements found when examining TEN-T projects and operations are presented in Table 15.

Table 15 –Arrangements of TEN-T Projects and Operations

Arrangement	**Location**
Third Party Agency with board representing geographical area	Oresund Bridge Oresund Konsorteit Channel Tunnel Eurotunnel
Separate Construction on territory	Paris-Brussels Axis SNCF and Infrabel Brussels-Amsterdam Infrabel and High Speed Alliance Brussels-Cologne Infrabel and DB
Distinct Operation with shared funding	PBKA Operations Thalys PBL Operations Eurostar
Operations – Independent Operator paying fees	France – Brussels Service TGV service by SNCF to Brussels Germany – Brussels Service ICE Service by DB to Brussels The Netherland – Belgium Service High Speed Alliance to Antwerp and Brussels Channel Tunnel Freight Service in Channel Tunnel Oresund Bridge Sale of Railway Operation rights

5.2 – Similarities Between Project Types

One type of organizational arrangement is found in every set of cases examined – an organization set-up to construct cross-boundary infrastructure and to operate and maintain that infrastructure. Table 16 lists those organizations and the infrastructure they own and operate:

Table 16 – Separate Organizations Set Up to Construct and Operate Cross-Boundary Infrastructure

Organization	Type infrastructure and operation	Level of Governance of boundary	Location
Metropolitan Atlanta Rapid Transit Authority	Heavy Rail Metro System	Type E – County	Atlanta, GA
Dallas Rapid Transit Authority	Light Rail System	Type F – City	Dallas, TX
Valley METRO Rail	Light Rail System	Type F – City	Phoenix, AZ
Sound Transit	Commuter Rail System, Light Rail System	Type E – County	Seattle, WA
Southeastern Pennsylvania Transportation Authority	Commuter Rail System	Type E – County	Philadelphia, PA
South Florida Regional Transportation Authority	Commuter Rail System	Type E – County	Southeastern Florida
Regional Transportation Authority	Commuter Rail System	Type E – County	Nashville, TN
Delaware River Port Authority	Toll Bridges, Heavy Rail Line	Type C – State	Philadelphia, PA and Camden, NJ
Delaware River Joint Toll Bridge Authority	Toll Bridges	Type C – State	Pennsylvania and New Jersey
Oresundbro Konsorteit	Toll Rail/Road Bridge	Type B – National	Denmark and Sweden
Eurotunnel	Channel Tunnel	Type B – National	United Kingdom and France
Northern Indiana Transportation Commuter District	Commuter Rail System	Type E – County	Northern Indiana
Denton County Transportation Authority	Bus and Rail system	Type F – City	Dallas, TX
Valley Metro	Bus System	Type F – City	Phoenix, AZ
Bellevue Bridge Commission	Bridge	Type C – State	Bellevue, NE

Additionally, there were a number of arrangements between existing transportation service providers set-up to operate distinct cross boundary services separately from their primary identity. Table 17 lists those types of operations.

Table 17 – Transportation Service Providers Operating Distinct Cross-Boundary Services

Organization	Type infrastructure and operation	Level of Governance of boundary	Location
Olympia Express	Bus Service	Type E – County	Seattle, WA
Virginia Railway Express	Commuter Rail	Type D – Regional Planning Areas	Northern Virginia
Trinity Railway Express	Commuter Rail	Type E – County	Dallas/Ft. Worth, TX
Thalys	High-Speed Intercity Rail	Type B – National	France, Belgium, Germany, the Netherlands
Eurostar	High-Speed Intercity Rail	Type B – National	France, Belgium, United Kingdom

Each of these organizations, whether they own and operate or simply operate cross-boundary services, has a structure that is designed to reflect through ownership or board representation all sides of the boundaries they cross. Therefore, one type of organizational structure for cross-boundary infrastructure and/or services is:

THIRD PARTY ENTITY – A separate entity set-up to construct and/or operate cross-boundary transport infrastructure and/or services whose governance structure or ownership represents the geographic areas over which they operate.

Another way cross-boundary infrastructure or services are provided is through some type of intergovernmental agreement, a memorandum of understanding, contract, etc., whereby each entity involved maintains its separate identity, but the two or more entities agree to allow or provide certain joint services. Table 18 lists these types of arrangements. One additional example not noted in the presentation of the results, but included here, is the inter-governmental agreement within Belgium

governing the start of construction for the high-speed lines simultaneously in all Belgian regions in 1993. This was not included in the results presented for the TEN-T since this agreement did not cover the international segments of the high-speed lines, but dealt with cross-boundary issues within Belgium itself. Since it is an example of an organizational arrangement to provide cross-boundary infrastructure, it is included here.

Table 18 – Contractual Agreements

What	**Type**	**Level of Governance of Boundary**	**Location**
MARTA reciprocal Fare agreements\	Transit Fare Agreement	Type E – County	Atlanta, GA
MDT transfers to Tri-Rail and Broward County	Transit Fare Agreement	Type E – County	Miami, FL
NICTD operation in Illinois	Rail Access Contract	Type C – State	Chicago, IL
Maintenance Agreement for Woodrow Wilson Bridge	Bridge Maintenance	Type C – State	Virginia, Maryland, and District of Columbia
Nebraska DOR	Bridge Maintenance and funding	Type C – State	Nebraska and neighboring states
ICE service to Brussels	Rail Access Contract with Infrabel	Type B – National	Germany and Belgium
TGV service to Brussels	Rail Access contract with Infrabel	Type B – National	France and Belgium
HSA Service to Brussels	Rail Access contract with Infrabel	Type B – National	The Netherlands and Belgium
Puget Pass	Regional Fare Card for Transit Services	Type E – County	Seattle, WA
Channel Tunnel	Freight Rail Access Operations	Type B – National	France and the UK
Oresund Bridge	Train Operation Rights	Type B – National	Denmark and Sweden
LGV Construction in Belgium	Rail Construction Agreement	Type C – State	Brussels, Wallonia and Flanders

Therefore another arrangement for providing cross-boundary services is:

<u>CONTRACTUAL ARRANGEMENT</u> – An agreement such as a contract or memorandum of understanding whereby two or more entities agree to construct, operate or maintain cross-boundary infrastructure or services while keeping their separate identities.

One additional type of arrangement is for an entity, the funding entity, to pay another entity, call it the operating entity for convenience, to construct or operate a specific piece of cross boundary infrastructure or service with the operating entity operating the service or constructing the infrastructure under its own identity. Table 19 lists examples of this type of agreement.

Table 19 – Examples of Fee for Services Arrangements

What	Type of Service	Boundary	Location
Canton Commuter Service	Express Bus	Type E – County	Atlanta, GA
MDT Local circulators	Local Bus	Type F – Municipal	Miami, FL
Pilgrim's Promise	Commuter Rail Service	Type C – State	Rhode Island and Massachusetts
Woodrow Wilson Bridge Reconstruction	Bridge Construction	Type C – State	Maryland, Virginia, and District of Columbia
U.S. 82 Greenville Bridge	Bridge Construction	Type C – State	Mississippi and Arkansas

Therefore, another type of arrangement for cross-boundary infrastructure construction or operation is:

<u>FEE FOR SERVICES</u> – An agreement between two or more entities whereby one entity pays another entity to construct or operate the cross-boundary infrastructure or service.

Other types of arrangements, such as the state created entities like GRTA, the MBTA, and the RTD, were not found at other levels of governance. In other words, there is no instance of the U.S. Federal Government imposing an organization on states to provide transportation infrastructure without the states' cooperation or the European Union creating a trans-national organization without its member states' cooperation. It is possible that investigation into transportation infrastructure and service provision in more centralized nation-states whose sub-national governments do not have as much power as U.S. states such as France or the United Kingdom, would reveal similar organizations for regional levels of governance within those countries. Similarly, there were no instances in the United States of each government agreeing to build a specific piece of infrastructure up to its borders to meet up with a complementary piece of infrastructure from a neighboring jurisdiction such as occurred between Belgium and its neighbors when constructing the high-speed train lines.

5.3 – Interviews

In order to ground these results in the actual practice of transportation planning and project development, a series of short interviews were conducted with individuals involved in planning and development of cross-boundary infrastructure projects. Ten (10) individuals were interviewed with the individuals representing a variety of backgrounds including individuals with experience working for local governments, regional governments, state governments, national governments, supra-national governments, and non-governmental entities involved in transport issues. Table 20 list the major challenges the interviewees identified as facing the

development of transport infrastructure projects in the future. The interview form is located in Appendix A.

Table 20 – Views of Major Future Challenges Facing Transport Projects

Challenges	**Number of Respondents**
Lack of Political Will	2
Lack of Financing/Funds	9
Lack of Public Awareness of Infrastructure Financing – Already "Paid" for infrastructure	1
Institutional Barriers - weak decision making	3
Regulatory Barriers – i.e. NEPA Process, Permitting and Design, Railway Working Rules	3
Priority Setting (National Governments focused on national priorities, Expressed as lack of Coordination, Antwerp Motorway in Brussels)	6
Social / Environmental Impacts	2

Perhaps the most unified agreement, though maybe not the most surprising, is that nine (9) interviewees, no matter what their background, identified funding and financing of transport infrastructure as one of the major challenges in development of transport infrastructure projects. The near unanimity among the respondents suggests that financing of major transport projects is **the** major challenge. The only other response that more than three (3) interviewees noted was the challenge of priority setting.

Asking the interviewees whether they had specifically encountered the types of organizational arrangements noted in the examinations of different types of transport infrastructures and services, most interviewees had encountered either an contractual arrangement or the creation of a third party entity. Only two interviewees had encountered examples of fee for services arrangement. Table 21 shows the responses to whether the interviewees had encountered specific types of arrangements.

Table 21 – Interviewees Recognition of Specific Cross-Boundary Arrangements

Institutional Arrangement	Number of Respondents
Contractual Arrangement	8
Third Party Entity	7
Fee for Services	2

The interviewees were also useful in that they were able to clarify specific aspects of the cases examined. For instance, a member of the Directorate-General for Energy and Transport (DG-TREN) was able to confirm that each member-state is responsible for construction of the rail line on its side of the border explaining why construction of the PBKAL segments in continental Europe were each constructed by their respective governments.[150]

5.4 – The Issue of Control

One of the central issues of concern in setting up cross-boundary organizations is how to make sure that the governmental entities involved make sure the infrastructure or services they are desiring is actually provided. Therefore, it is interesting to note that for the three previously noted types of arrangements, each one has a different method for the involved governments to maintain control. One of the major points that seems to govern which type of arrangement is selected is the complexity of the service or infrastructure provided

Complexity here is used to mean how complicated it is to operate the infrastructure or service on a day-to-day level. For example, running an entire bus

[150] *Interview of J. Hugh Rees* (Brussels; Directorate General for Energy and Transport, April 25, 2006)

network consisting of potentially hundreds of routes between multiple jurisdictions is more complex than maintaining a non-toll, local traffic bridge across a river between two states. Five main levels of complexity were identified:

1. Whether only two major entities were involved in providing the cross-boundary service or infrastructure
2. Whether the infrastructure or service required intensive day-to-day labor requirements
3. Whether infrastructure ownership was involved
4. Whether there were multiple routes or pieces of infrastructure involved
5. Whether there is only one major entity providing the transportation service or infrastructure

These next paragraphs illustrate the types of complexity being discussed. For example, compare the Thalys and SNCF service to Brussels. Both services primarily provide travel between Paris and Brussels with other services offered to Marne-le-Vallee (Disneyland Paris) and other destinations in France such as Marseille and seasonal services to the French Alps for skiing. However, SNCF operates one service directly and is part owner of the other service. Thalys also serves areas north of Brussels with its trains continuing on to Amsterdam and Cologne as well as several trains operating to other destinations within Belgium such as Oostende and along the Meuse River valley to serve secondary Belgian cities such as Charleroi, Namur, and Liege. This means that Thalys services require a greater involvement with SNCB since it operates over more of the Belgian network as well as cooperation with the Dutch and German infrastructure owners. In contrast, SNCF only has to have access

on the LGV between the French border and Brussels for its services. Therefore, on a day-to-day basis, Thalys operations have to provide services on three different cross-border segments and along multiple different lines, while SNCF services must only deal with one cross-border segment and line. Examining other types of services also reveals similarities. Services involving multi-route operations, multiple governmental entities, and/or infrastructure requiring continuous day-to-day operations tend to be separate entities set up by the involved governments – the examples found are listed in Table 16 – Separate Organizations Set Up to Construct and Operate Cross-Boundary Infrastructure and Table 17 – Transportation Service Providers Operating Distinct Cross-Boundary Services. Each of these examples operates some type of service requiring either multiple routes or multiple pieces of infrastructure, with two exceptions: the Trinity Railway Express and the Bellevue Bridge Commission. Control of these organizations is also fairly consistent with control balanced by some type of geographic representation – whether it is through seats on the governing board or through ownership of the company.

On the other side, intergovernmental agreements or contracts are utilized when the service or infrastructure is less complex. Again, HST services to Brussels provide more examples. As noted before, Thalys, the separate entity set up that is jointly controlled by SNCF, SNCB, DB, and NS, provides services from Brussels to Cologne, Amsterdam, and Paris – services that are also provided directly by SNCF and DB and through a proxy of NS – the HSA. However, SNCF only provides service to Paris, HSA only to Amsterdam, and DB only to Cologne. This means that providing these non-Thalys international services only requires negotiation between Infrabel, the owner of the Belgian rail network, and the operator of the services and only over one line of track. There is no need to cooperate across multiple boundaries

and the services only use one piece of the Infrabel network. Looking at the examples in Table 18 – Examples of Agreements Between Governments, most of these examples involve either a discrete single piece of infrastructure, such as the case of Woodrow Wilson Bridge, or operation of a service over a single piece of infrastructure as noted above with services to Brussels or NICTD operations within Illinois. What these projects have in common is that they cover a specific item, either a piece of infrastructure such as a bridge or a single line of service, and that the entities involve maintain direct control over the infrastructure or service. The two projects – Puget Pass and the LGV construction within Belgium represent two interesting exceptions. Puget Pass falls into this category for the reason that deals with a unified fare collection system for the Puget Sound region in Washington State. While on the surface, this arrangement would be more appropriate as a distinct entity because of the network nature of the Puget Pass, complexity of day-to-day operations, and multiple entities involved, since the arrangement involved collection and distribution of the actual fares, the entities involved, the transit operators in and around Seattle, desired direct involvement rather than control through a governing board or ownership. An intergovernmental agreement is more appropriate in this case since the entities involved wanted direct control over the arrangement. Construction of the LGV within Belgian also falls into a funding category with each region desiring a commitment to have concrete proof that the stated investment would occur – an impasse involved by having construction start simultaneously.

One extremely important point must be made here. The Third Party Arrangement covers a wide range of types of agreements and services. Since this type of arrangement covers different forms such as service agreements, public authorities, public-private partnerships, and ostensibly completely private enterprises,

it is likely that as more of these types of arrangements are developed, different categories of "Third Party Arrangements" will arise. However, the current sample size, particularly with regard to those arrangements involving non-public funding sources, does not allow these potential sub-groups to be clearly identified at this time.

Another influence on the type of organizational arrangement selected for cross-boundary infrastructure or services is the ability of an existing organization with the wherewithal and ability to provide the desired infrastructure or service. For fee for services type of arrangement, this seems to be the primary motivating factor for provision of services. In the case of the small cities within Dade County, the City of Canton, and the State of Rhode Island, these entities did not have resources to provide the service they desired on their own. Moreover, there were already existing organizations available to provide those services – MDT in Miami, CCT in Canton, and the MBTA in Rhode Island – located in an adjacent jurisdiction and these organizations had the institutional capabilities and resources to implement the desired service. Additionally, each of the entities that wanted the service only desired a limited amount of service, typically one route, from the existing service provider. Therefore, simply paying an existing operator to provide service outside of its jurisdiction appears to be simpler than starting up a completely separate service.

Table 22 provides an overview of when it is appropriate the different types of organizational arrangements in different situations. This table is illustrative of the examples found in the course of the research for this dissertation and could be used as a suggestion of what types of arrangements to explore when presented with a specific problem. Additionally, as the table clearly shows, there are times when two different types of arrangements are appropriate, suggesting that the situations where different organizational arrangements are appropriate overlap.

Table 22 – Organizational Arrangements for Potential Situations

Situation	Third Party Entity	Contractual Agreements	Fee for Services
More than two entities	X		
Infrastructure with no day-to-day labor requirements (i.e. Bridge)	X	X	X
Limited cross-boundary routes outside operator's service area		X	X
Infrastructure with day-to-day labor requirements (i.e. toll bridge)	X		
Multiple Primary service providers (i.e. multiple, independent bus services)	X	X	
Multi-route system with no infrastructure ownership (i.e. regional bus operation or rail operation)	X	X	
Multi-route system with infrastructure ownership (i.e. regional transit operation where owns the rail or busway)	X		

When discussing independent entities, how the funding of these entities is controlled is an important point to make. With contracts or agreements and financial payments, the entities involved have direct control of the funding of the arrangement. For example, Rhode Island makes direct payments to the MBTA in return for

provision of the commute rail service to Rhode Island and MARTA and CCT each collect the fares directly and transfer the monies for the transferring passengers directly to each other. With independent entities, this direct control of funding is not the case.

Instead, each independent entity has its own budget and financial identity – part of the reason for its independence. How the participating entities maintain control of these independent organizations exposes one of the primary differences between independent entities in the United States and the EU. In the United States., these independent entities are usually some form of public authority or corporation where control is governed by a board. Board composition usually contains representatives from each of the geographic areas involved. For example, the governing board of VRE contains three representatives each from each of the MPOs that formed VRE and the DRJTBC contains three representatives each from Pennsylvania and New Jersey. One possible explanation for the use of authorities and public corporations is the ability of these entities to use public financing sources such as sales taxes and access to government bond markets in the United States that have lower interest rates. In contrast the boards used in the United States, control over the examined independent entities in Europe is governed by ownership shares similar to private companies. As discovered by examining the ownership of Thalys and Eurostar, the geographic control is balanced by ownership of shares rather than direct board appointments. One potential advantage of using an ownership control rather than direct board control is the ability to tap into the private financial markets which enable these organizations access to more sophisticated and diverse range of financing measures available in the private financial markets. Since these entities have at least some public owners, they also have access to the public financial markets enabling

them to mix both private and public financing measures as shown in the construction of the Oresund Bridge. The lack of these types of arrangements in the United States is a little surprising, but it could perhaps be related the experience of the National Railroad Passenger Corporation, more commonly known as AMTRAK and suggests an avenue of future research. Whatever the reason, it is clear that there are several options for maintaining financial control over independent entities with the formal set-up governed by the desired access to the private financial markets. Figure 3 provides a conceptual illustration of the interaction between complexity and financing and where each type of organizational arrangements could be placed.

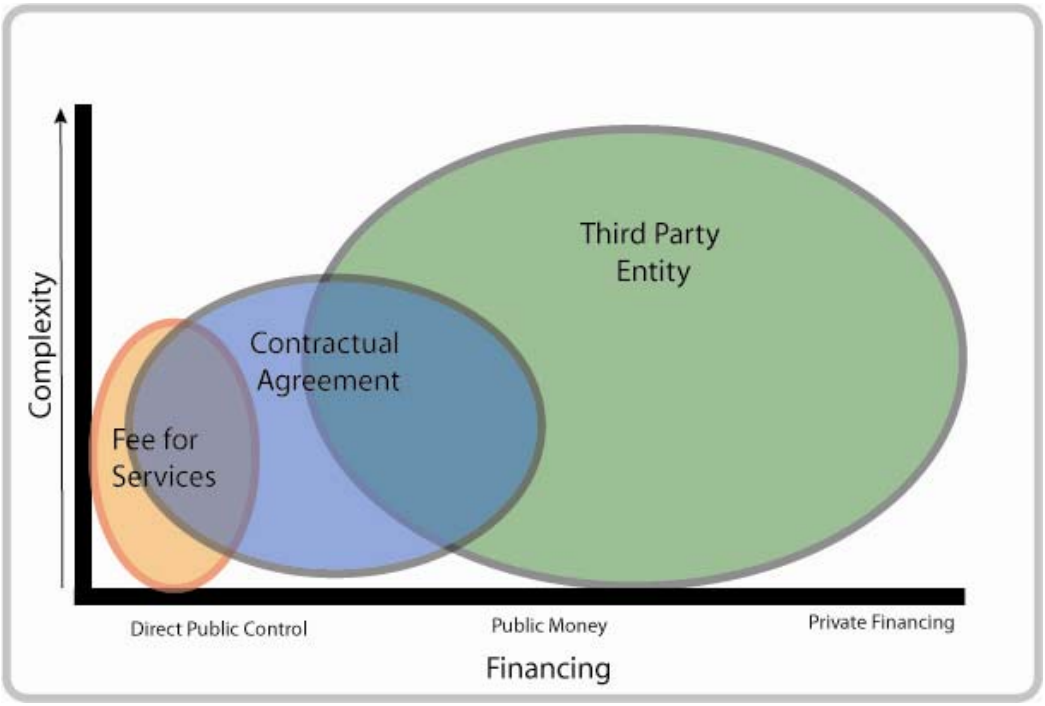

Figure 3 – Conceptual Interaction between Financing and Complexity

The conceptual figure above is meant to show that direct public control usually occurs in less complex situations with independent entities being able to handle a full range of complexity, but with less direct public control and contracts or

agreements fulfilling a role somewhere between the two. The borders are blurred to illustrate that this relationship is not absolute and that in certain situations different types of organizational arrangements can be found fulfilling the same purpose. The blurred borders also indicate that there are situations when two different types of arrangements could be used indicating that the transition between the types of organizational arrangements is fluid.

5.5 – Additional Thoughts

In addition to revealing what types of organizational arrangements are used for cross-boundary transport infrastructure construction and service operations, this research also suggests which types of arrangements are appropriate for different cases. For example, a third party entity is used most often in cases where there is a need to maintain continuous, day-to-day operations such as running trains or buses or operating toll facilities. A distinguishing feature between the setting up of a third party entity or using a simpler contractual agreement is the complexity of the services involved. For example, international rail service to Brussels consists of two separate entities – Eurostar and Thalys – and two intergovernmental agreements – SNCF and DB services. In the case of Eurostar and Thalys, these organizations are the result of the need to operate in three or more countries over multiple tracks while the SNCF and DB services require only negotiations on one line between France and Germany respectively. While there are examples of single purpose third party entities such as the Bellevue Bridge Commission, there are only a few examples of single contractual agreements governing multiple cross-boundary services such as Puget Pass in Seattle.

Another striking similarity that occurred in two cases is geographical equity. While this factor is most prevalent in the voting control of the organization, either

through political appointment or shareholding, it is worth noting that in two cases, establishment of Sound Transit in Seattle and the construction agreement of the Belgian portion of the PBKAL axis, one of the important factors was that construction physically takes place in each of the involved entities within a specified time period. Also worth noting was that in each case, the investment to take place was explicitly spelled out with a timeline for completion. This suggests that the method garnering support for places that might be reluctant to construct or operate cross-boundary services is to develop a detailed work plan that specifically spells out the investments to be made and shares those investments proportionally across the involved governments.

In the fee for services cases, it appears to be an attempt to provide more efficient service delivery. For example, the Channel Tunnel experience showed that it is important to have a single entity responsible for construction and in the case of the Woodrow Wilson Bridge and the new U.S. 82 Bridge over the Mississippi, the control given to the states of Maryland and Mississippi respectively appear to be heeding this lesson by having one entity responsible for construction. In the case of the transit services paid for by the City of Canton and Rhode Island, the agreement could be an attempt to arrange services by contracting with an existing provider with the wherewithal, both financial and technical, to provide the service rather than building that capability in house. Both cases are examples where provision of the infrastructure or service is more efficient than creating an independent third entity and that this type of arrangements is found at different levels of governance.

These results clearly show that places struggling with the provision of cross-boundary infrastructure of services have at their disposal a wealth of examples from

three primary types of organizational arrangements no matter what type of boundary is involved:

1. A contractual agreement
2. Creation of a third party entity
3. Paying a fee for a desired transport service

Within these basic types, there is variation, but the basic type of arrangements remains the same at all levels of governance. This means that metropolitan areas struggling to create regional transit systems or supra-national organizations trying to encourage the development of continental scale transport networks can learn from the cross-boundary experiences developed at the local, regional, and international levels to create the arrangement best suited to the particular challenge at hand.

CHAPTER 6

DISCUSSION AND IMPLICATIONS

At the end of Chapter 2, this dissertation set out to answer one primary question:

> **Do governments at all levels of governance develop similar organizational solutions in the construction and operation of transportation infrastructure?**

The results presented in Section 5.2 show that governments do indeed developed similar organization solutions at different levels of governance in the construction and operation of cross-boundary transportation infrastructure. This suggests that the lessons that are learned for cross-boundary projects at one level of governance could be applied to cross-boundary projects at another level of governance. It also means that policy makers, planners, and engineers facing a project that involves cross-boundary organizational challenges should examine other, similar projects that involve cross-boundary issues at the local, regional, sub-national, and national levels of governance. To help illustrate the implications of this result, it might be use to briefly show how this result can be applied to two existing situations in 2006 – the effort in Atlanta to develop a regional transit system and the European Union's effort to promote completion of the TEN-T.

6.1 – Atlanta Regional Transit

As discussed throughout this dissertation in different places, one of the challenges facing the Atlanta region is the development of regional transit services. The region is split between a multitude of operators with limited coordination between operators resulting in limited opportunities for cross-county travel by transit within the region. As noted in Chapter 2, the region has recognized the problems with its institutional arrangements and embarked upon a Regional Institutional Analysis resulting in the formation of a Transit Planning Board responsible for developing a series of concrete steps towards developing regional transit capacity in the region including developing a plan for financing of new investments

Since one of the major challenges in providing cross-boundary transit services in Atlanta is a strong desire for local control and its perceived better responsiveness to the public interest, any provision for regional transit services must address organizational arrangements of cross-boundary services. The examples in this dissertation provide a number of potential tools that could be helpful in all aspects, but in particular with the developing a workable financing plan for transit investments.

The first example, in overcoming cross-boundary issues between parties that have had difficulties in agreeing upon construction and operation of cross-boundary infrastructure, the examples of Sound Transit in Seattle and construction of the Belgian portion of the PBKAL axis provide a clear example of how to overcome this difficulty – create a well-defined list of projects that will be constructed or services provided, including a timeline of construction, with each of the involved having a clear idea of what will be the benefits for their area. Naturally, this requires making sure that the project list benefits each area proportionally to the amount it will be

paying for services. In this way, each of the counties involved will know what benefits they will receive and when they can be expected to receive those benefits. It may require something similar to the agreement between Brussels, Wallonia, and Flanders stating that construction will commence by or on a certain date simultaneously each county.

Another challenge for Atlanta has been identifying what organization will operate the cross-boundary services. While the region has an existing agency that is authorized and could operate cross-boundary services throughout the region, and in fact does, GRTA has indicated that it does not intend to operate new services.[151] Rather than creating an entirely new regional authority with its own governing structure and requiring some type of legislative approval, it might be preferable to create a company organization such as Trinity Rail Express in Dallas, Olympia Express in Seattle, Thalys or Eurostar – a separate entity such as a company whose ownership is controlled by the existing local transit operators in Atlanta. Let us use an example strictly for illustrative purposes to explore how this type of arrangement might work in Atlanta.

The existing transit operators in Atlanta could form a company called *Piedmont Transportation Association (PTA)* that would take over all of the express bus operations currently operating in Atlanta and potentially the MARTA rail system as well. Control of the organization would be each system having a vote on the board of the company with voting governed proportionally initially by the value of the assets transferred to the *PTA* and the value of the operational support provided to regional services to be operated by the *PTA.* The *PTA* would then become the designated operator of the all of the proposed regional BRT services, the express bus

[151] Comment from TPB Retreat September, 2006.

system, and the proposed commuter rail lines. Control of the *PTA* would continue to be based upon funding invested in regional transit so that as new services were added the new areas would be represented. Additionally, if existing members funded regional transit investments, those investments would translate into increased voting proportions for the *PTA* – similar to purchasing a greater amount of stock in a company. The following example may illustrate this picture further. Just as an academic exercise, say that the total value of all assets transferred to the *PTA* were valued at $100 million. Douglas County, just west of Atlanta, decided to transfer its multi-modal center in Douglasville, worth $5 million, to the *PTA* in order to buy into the system but no operating support, it would receive 5% of the voting rights governing the *PTA*. If Douglas County later decided to provide $10 million for operational funding to the *PTA*, the *PTA's* new funding would be $110 million and Douglas County's voting rights would increase to 15/110, or 13.6%. Without focusing too specifically on this particular example, the important point to make is that the existing transit operators in Atlanta could form a third operator, controlled proportionally by them, and learn how to successfully create, run and operate this type of system by examining the experiences of such operations as Trinity Rail Express in Dallas and Thalys in Europe.

One final lesson on improving the implementation of cross-boundary transit in Atlanta is an approach being tried by the EU Commission to facilitate completion of cross-border segments of specific TEN-T axes – appointment of coordinators. As has been noted before, the EU Commission has noticed the progress on several TEN-T corridors is not progressing as planned and that a major impediment is delay of the cross-border segments. Therefore, in July of 2005, as a trial in expediting construction of some of these projects, the EU Commission appointed six (6) people

as “Coordinators” responsible for shepherding their respective projects through implementation. There were several conditions that these coordinators had to meet including having a well-respected and influential reputation (i.e. the ability to have access to the major decision makers along the project route) and they could not be a citizen of a member-state along the project route. Returning to Atlanta, there are four projects that might be able to benefit from the appointment of coordinators to help speed their implementation: the Northwest BRT line, the BRT Line from Cumberland to Doraville along I-285, the Lovejoy-Atlanta Commuter Rail line, and the Athens-Atlanta Commuter Rail line. Each of these projects has been in the RDP and is facing delays towards implementation. Similar to the EU Commission, the Atlanta Regional Commission has identified these projects as needing implementation, but it has limited ability to force the respective lower governments to construct the projects. Therefore, following the lead of the EU Commission, ARC could appoint project coordinators for each of these projects who are politically respected enough to have access to the major decision makers for these projects, but also requiring that these coordinators not work for one of the agencies directly involved in the project’s implementation and preferably not live in an area to receive direct benefits from the project. Potential coordinators could include former President Jimmy Carter, former Senator Max Cleland, one of the current sitting U.S. or State Senators or Representatives, CEO’s of major companies in Georgia such as SunTrust, Georgia Pacific, or AFLAC, or some other figure with enough stature and respect to bring all the involved parties to the table. The concept of appointing coordinators shows how examining how examining how the challenges of cross-boundary organization are overcome at **any** level of governance can lead useful solutions.

6.2 – Vidin/Calafat Danube Bridge

To show that the process of learning from cross-boundary issues does not just work from lower levels of governance learning from higher levels of governance, it is helpful to examine how cross-boundary issues between two nations can learn from how sub-national levels resolved cross-boundary issues. For example, two priority axes of the TEN-T, Priority Axis no. 7 – Motorway from Igoumentisa/Patras, Athens, Sofia, and Budapest and Priority Axis no. 22 – Railway axis Athens, Sofia, Budapest, Vienna, Prague, Nuremburg/Dresden, have crossings of the Danube River between Vidin, Bulgaria and Calafat, Romania. Currently, there is no bridge at this location and the crossing of the Danube is made by a ferry and the nearest other crossings between Romania and Bulgaria on the Danube is located at Giurgui downstream from Vidin and Calafat and north at Severin upstream from Vidin and Calafat. While the bridge has been under consideration for some time and an agreement was reached between Bulgaria and Romania in 2000, the bridge is not completed with work in Bulgaria mainly focusing on improvements to access roads and rails to Sofia.[152] In the face of lengthening delays on the bridge project, originally supposed to open in 2005, and potentially a series of conditions on their membership in the EU, particularly with regards to the aid given out for infrastructure projects, the EU could consider encouraging Romania and Bulgaria to examine other ways to build the new bridge between Vidin and Calafat.[153],[154]

Out of the cases examined, one type of organization that could be considered is setting up a third part entity that is either responsible for all new bridge crossings of the Danube between Romania and Bulgaria or a more localized group responsible for

[152] *Pan-European Transport Corridors and Areas Status Report: Final Report* (Brussels; Directorate General for Energy and Transport, November 24, 2005) 72-73.
[153] Peter S. Green, "The Danube's Economic Blues; Balkan Area Hopes a Bridge Can Put It on Road to Riches," in *The New York Times* (New York; Sulzberger Group, January 6, 2001).
[154] "A dim green light," in *The Economist* (London; The Economist Group, May 18th, 2006).

crossings just between Calafat and Vidin. While the EU and European countries, as noted in the cases above, one of the concerns with the ascension of Bulgaria and Romania to the EU is the level of good governance, particularly in the legal system. Therefore, turning to the U.S. interstate experience, the EU might encourage the formation of a type of International Authority, a semi-public agency with access to the lower-rate government bond markets, that is separate from respective governments, but whose financial discipline are achieve through the international finance markets. This type of authority takes the lesson from the Channel Tunnel, whose owners were not able to access the lower rate governmental bond market, with the lessons of the successful Delaware River Port Authority and Delaware River Joint Toll Bridge Commission, which, while responsible to the public sector, are also financially independent.

Section 6.3 – Areas for Further Research

The result that in the construction and operation of transportation infrastructure, different levels of governance reach similar organizational arrangements suggests several different avenues for further research. First, while this dissertation has focused on transportation infrastructure and was conducted primarily for the purpose of examining the challenges of cross-boundary transport for an engineering and planning audience, what does this result suggest for a public policy / comparative government audience? In other words, what avenues of research does this suggest to a different audience, such as whether as globalization increases, are different levels of governance developing similar solutions to similar problems in other areas such as control of water resources or trade agreements.

Another area of research would be to expand the types of projects examined. This could occur in two main directions. First, the examination could be expanded to include examples of projects from all members of the OECD countries to provide a representative sample practice within all industrialized countries. The other direction would be to expand the examination to projects in industrializing countries and see if these countries are developing different or similar organizational arrangements than those found in the OECD countries. Additionally, as noted in Chapter 5, the universe of third party entities covers a wide range of different organizations. A closer examination of third party entities and their various types might yield some interesting sub-groups. A particularly suggestive vein of research would be to examine the development of third party entities with regard to financing methods – pure public, mix of public and private, and fully private financing. The increase in use of PPPs suggests that in the near future, a much wider range of examples will be available for study than currently exists.

Additionally, this research also suggests that a fruitful vein of research would be in exploring the similarities between the development of PPP projects in the United States with the existing PPP projects in Europe. In particular, it would be useful to provide a critique of U.S. PPP projects using the lessons learned on European PPPs such as the French motorway networks and the recent British experiences. The British experiences with mass privatizations, particularly with regard to railroad infrastructure could provide useful information for the growing information on laws governing PPPs, particularly for ensuring that there are adequate mechanisms for addressing any conflicts that might arise between the public and private entities involved. In particular, an associated line of research here would be whether the U.S.

experience with AMTRAK has limited the development of mix-financing types of arrangements.

Overall, this dissertation suggests several different lines of additional research that should be explored that range from moving into a stronger social science examination with a public policy focus as well as examining ongoing interest in the engineering and planning communities with new methods for financing transportation infrastructure and services.

Section 6.4 – Final Thoughts

What these examples from Atlanta and southeastern Europe reveal are the main impact that this research should have: the ability to examine projects and services without limiting the scope of universe of projects that only take place at the same level of governance. It allows engineers and planners, when they are faced with a problem that partially results from cross-boundary issues, to examine not just how this problem was solved at similar levels of governance within which they are operating, but across the spectrum of governances. While the challenges of providing cross-boundary infrastructure and services are present and growing, having an appropriate organizational arrangement is only part of making a good project. Having an appropriate organizational arrangement will reduce the successful political challenges in providing cross-boundary infrastructure and services and allow engineers and planners to focus instead on the technical and practical matters such as service headways, tunnel construction techniques or structural design for which they were trained. This research should help engineers and planners to find an appropriate organizational arrangement by allowing them to examine similar projects, without regard to the governance levels involved. This will provide them with examples of

appropriate organizational arrangements that work so that they can focus on the technical challenges in infrastructure and service development.

APPENDIX A: INTERVIEW FORM

Cross Boundary Projects Interview Questions

General Background

Detailed questions of General Background: *This set of questions will be asked of all subjects. These questions are intended to help confirm that cross-boundaries issues are a major challenge facing implementation of projects.*

1. What are the three major challenges you see in constructing major transport projects in the near future?

2. Why / Why not – political challenges?

3. Given the principles of subsidarity / local control (depends on EU or U.S. context), can you think of any projects where governmental conflict has played a major role in delaying a project?

   Which ones?

4. Given the principles of subsidarity / local control (depends on EU or U.S. context), can you think of any projects where governmental cooperation has played a major role in speeding up project development and construction?

   Which ones?

5. Overall, do you think cross-boundary governmental conflicts will be more or less likely to be present in transport infrastructure development and construction?

   Why?

Specific Questions Regarding Generalized Results

This set of questions relates to the general organizational structures surrounding cross- boundary projects.

1. In your experience, have you noticed a particular manner in which cross-boundary projects are organized?

2. If so, would you describe the type(s) of organizations?

3. In the course of this research, one type of organization that appears to occur is that the parties involved set up a third organization to construct, operate and maintain the infrastructure – have you encountered an this type of arrangement? If so, where and on what projects?

4. Did this type of arrangement seem successful to you? Why or why not?

5. Another type of arrangement that occurs is bi-lateral agreements between the two governments involved where each government assumes responsibility for the infrastructure within its borders – have you encountered an this type of arrangement? If so, where and on what projects?

6. Did this type of arrangement seem successful to you? Why or why not?

7. One final type of arrangement that appears to occur is that one government constructs, operates, and maintains the entire infrastructure – have you encountered an this type of arrangement? If so, where and on what projects?

8. Did this type of arrangement seem successful to you? Why or why not?

9. Have you encountered what you would consider another type of arrangement? If so, how would you describe this arrangement?

10. Did this type of arrangement seem successful to you? Why or why not?

11. Do you have any other comments or questions? Who else do you think I should speak to regarding cross-boundary projects?

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